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OPEC problems continue into 1988

THE ORGANIZATION OF PETROLEUM EXPORTING Countries entered 1988 in disarray.

Oil ministers of the world's biggest producing group, meeting in Vienna in December 1987, failed to agree on a means to shore up the collapsing production quota system. After an acrimonious 6 day session, the only thing ministers could agree to was an inconclusive compromise—continuation of ineffective production quotas from second half 1987 through the first 6 months of 1988.

According to Kuwait and Saudi Arabia, adherence to national quotas involved in the group's 16.6 million b/d production ceiling would be enough to defend the $18 bbl reference price in effect at the time.

But OPEC members went into the meeting with their combined production exceeding the total quota and did or said nothing in Vienna to convince the international oil market they were prepared to defend prices by cutting production. As a result, prices began to waver.

Industry and OPEC sources blamed tensions between Iran and Saudi Arabia for failure to reach an effective accord on quotas. The latter was supporting Iraq in its war against Iran. With both combatants attacking tankers in the Persian Gulf, OPEC ministers found it difficult at their meetings to concentrate on economic aspects of the oil business and avoid confrontations over politics.

Politics and religion are among many differences in the cultures of the 13 OPEC members, whose nations dot the globe from Latin America to Africa, the Middle East, and Southeast Asia (Fig. 1).

The December 1987 ministerial meeting occurred after 2 years of turmoil in the world oil industry, beginning with OPEC's decision late in 1985 to regain market share at the expense of oil prices. OPEC members were squarely in the middle of many of the events important to the oil industry during those 2 years, especially in the Middle East (Table 1).

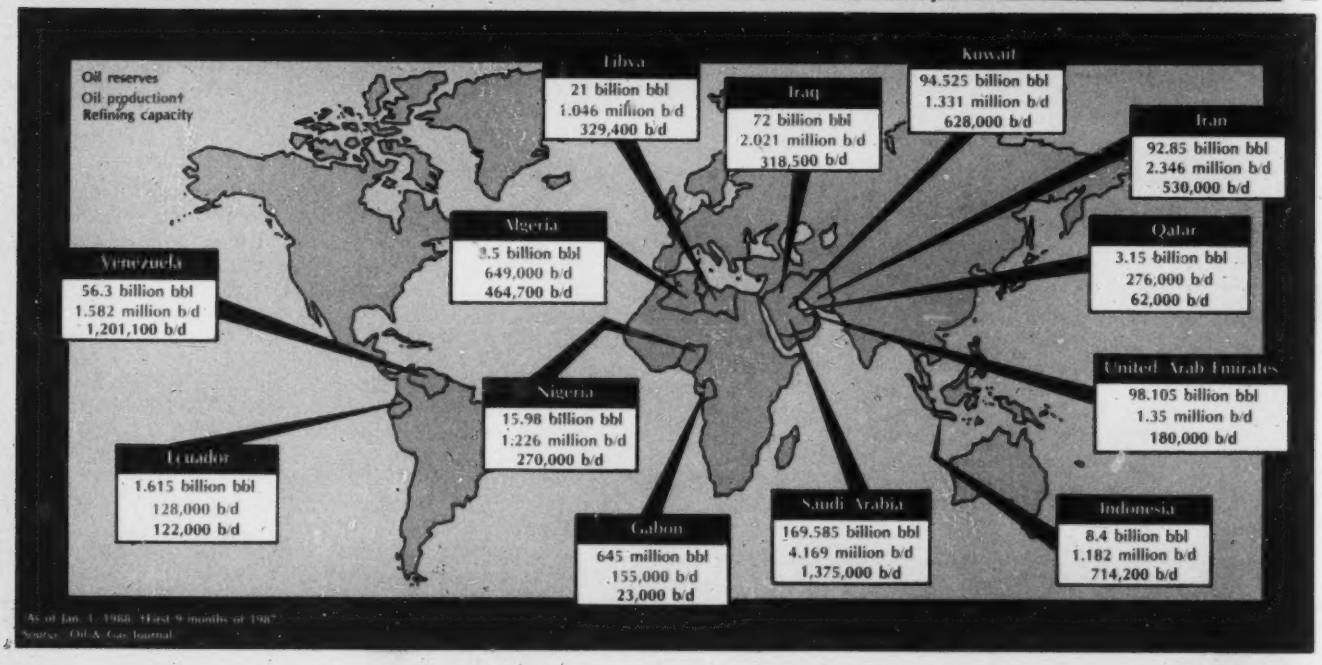
The Middle East, with six OPEC members, clearly dominates the organization in terms of oil reserves, production, and export volumes. Figures compiled by British Petroleum Co. plc show that the Middle East exported 9.44 million b/d of crude oil and 1.44 million b/d of products in 1986, the latest complete year for which figures were available. Much of the shipments moved in tankers (Fig. 5).

A distant second in exports by world regions disregarding OPEC, was Latin America with shipments of 2.325 million b/d of crude oil and 1.275 million b/d of products.

The international oil industry nervously watched the Persian Gulf, where Iran and Iraq escalated their so-called tanker war, under way since 1981 as an extension of their land war that began in 1980. Foreign vessels had been under attack since February 1984.

OPEC members and a sample of their petroleum assets*

1



As of Jan. 1, 1988. †First 9 months of 1987.
Source: Oil & Gas Journal

Table 1

Chronology of events

1986

Jan. 7—President Reagan orders U.S. economic sanctions against Libya.

Mar. 24—Despite slippage in crude oil prices, an OPEC ministerial meeting ends without agreeing to cut oil production.

Apr. 24—U.S. warplanes bomb Libya in response to terrorist attacks.

May 1—Crude oil discounts on top of netback prices introduced. Oil prices go into a free fall.

July 13—U.S. active rig count plunges to 663, the lowest level since World War II.

July 14—North Sea Brent blend crude oil spot price bottoms out at $8.75/bbl.

July 25—Spot price for West Texas intermediate crude hits its low point, $10.80/bbl.

Aug. 5—OPEC oil ministers agree to cut production by more than 3 million b/d. West Texas intermediate spot price climbs to more than $15/bbl.

Oct. 27—King Fahd fires Saudi Oil Minister Yamani and replaces him with Hisham Nazer.

Dec. 20—All OPEC members except Iraq agree to cut oil production by 7% to raise oil prices to $18/bbl.

Dec. 31—U.S. oil production falls by 250,000 b/d during the year after 4 years of increases.

1987

Jan. 27—Chevron Corp. reports a loss for fourth quarter 1986, its first since 1933.

Mar. 5—Alaska's giant Prudhoe Bay field produces its 6 billionth bbl of oil. Reserves are half depleted.

Apr. 20—Texaco Inc. files Chapter 11 bankruptcy to keep Pennzoil Co. from attaching its assets.

May 17—An Iraqi warplane attacks the USS Stark in the Persian Gulf, killing 37 American sailors.

June 15—Spot prices for West Texas intermediate rise to more than $20/bbl.

June 30—Unswayed by objections from Congress, President Reagan serves notice that the U.S. will proceed with a plan to place Kuwaiti tankers under the protection of U.S. warships in the Persian Gulf.

July 12—The number of merchant vessels—everything from supply boats to oil tankers—attacked by Iran and Iraq in the Persian Gulf since May 1981 reaches 330. Losses climb to 133 vessels totaling 8 million tons of shipping, equal to one third of total merchant tonnage destroyed in World War II. The gulf death toll among merchant seamen climbs to 200.

July 21—U.S. Navy begins escorting Kuwaiti tankers reflagged under U.S. colors in the gulf (Fig. 2).

July 31—A riot by Iranians in Mecca results in 402 deaths (Fig. 3).

Aug. 1—Iranians ransack the Saudi Arabian embassy in Tehran.

Aug. 10—Texaco's Texaco Caribbean tanker strikes a mine in the Gulf of Oman, just outside the Strait of Hormuz, after leaving the Persian Gulf with a cargo of crude oil. It's the first incident of its kind outside the Persian Gulf.

Sept. 30—U.S. oil production in the first 9 months averages 8.296 million b/d, off 480,000 b/d from the same period of 1986. Total non-Communist production averages 39.867 million b/d, off 966,000 b/d.

Oct. 3—Standard Oil Production Co. starts a 40,000 b/d flow from Endicott oil field in the Beaufort Sea off Alaska. It is the world's first hydrocarbon production in commercial volume from an arctic offshore field.

Oct. 19—U.S. Navy warships destroy an Iranian platform that was serving as a command post in the Persian Gulf (Fig. 4).

Oct. 27—President Reagan issues an executive order banning U.S. imports of Iranian oil.

Dec. 14—OPEC members except Iraq agree to extend 1987 production quotas through first half 1988.

Dec. 19—Texaco agrees to pay Pennzoil $3 billion to settle a $10.3 billion judgment, the biggest in history.

Source: Chevron Corp. and Oil & Gas Journal

said they would. For a while, at least. Production dropped to 17 million b/d in September. Prices began to rise.

OPEC ministers reconvened in October and had a marathon 17 day meeting that resulted in an extension of the previous accord with minor changes. OPEC was criticized for taking such a long time to reach an agrement. This was

Table 2

How OPEC members observed or ignored production quotas

	Quotas				Production
	1986	1987			1987
	December	First half	Second half	Year	First 9 months
	1,000 b/d				
Algeria	669	635	667	651	649
Ecuador	221	210	221	216	128
Gabon	160	152	159	156	155
Indonesia	1,193	1,133	1,190	1,160	1,182
Iran	2,317	2,255	2,369	2,312	2,346
Iraq	*1,780	1,466	1,540	1,503	2,021
Kuwait	999	948	996	972	†1,331
Libya	999	948	996	972	1,046
Nigeria	1,304	1,238	1,301	1,270	1,226
Qatar	300	285	299	292	276
Saudi Arabia	4,353	4,133	4,343	4,238	†4,169
U.A.E.	950	902	948	925	1,350
Venezuela	1,574	1,495	1,571	1,533	1,582
Total	**16,819**	**15,800**	**16,600**	**16,200**	**17,461**

*No quota. Production for December. †Includes 202,000 b/d from the Neutral Zone, where production is shared 50-50.

Source: Oil & Gas Journal

Table 3

Chevron's key predictions on petroleum markets

Non-Communist world

Crude oil prices will fluctuate at $15-30/bbl in 1987 dollars until 2000.

Oil demand will grow an average of only 0.8%/year, while oil's share of the total energy mix slides to 40% in 2000 from 46% in 1986.

Productive capacity will continue to top oil demand in the near term, but declining non-OPEC production in the 1990s will enable OPEC to boost its crude output to more than 55% of world supply in 2000 from 45% in 1986.

Surplus distillation capacity will continue to linger, but refiners may have to add resid upgrading capacity by the mid-1990s.

Gas demand will grow an average 2.7%/year, and end user prices will return to parity with fuel oil in the early 1990s.

Flaring of as much as 11% of gas production at present will end by 2000.

publication of Conant & Associates Ltd., Great Falls, Va.

An earlier issue of Geopolitics of Energy described this approach to management of U.S.-Soviet relations as a tacit acknowledgment that much of Southwest Asia—the part embracing Iran, Iraq, and the Arabian Peninsula—constituted a "zone of denial" in which neither superpower would take steps to threaten the other.

If the U.S. did not threaten to move into Iraq or Iran, and thereby endanger the southern flank of the U.S.S.R., the Soviet Union would abstain from actions that would threaten U.S. interests in the Arabian Peninsula.

This mutual forbearance eased tension considerably between the two superpowers.

In the "Gorbachev Era" it has seemed clear that on Soviet borders in Southwest Asia and in the Far East the Soviet Union has been making special efforts to implement policies and practices that extend the principle of a zone of denial. That permitted the Kremlin to focus its attention and resources on domestic priorities.

Another view maintained that the Soviet Union in many places, including the Persian Gulf, was engaging in more sophisticated gamemanship. The U.S., with its room for maneuver narrowly defined by its "strategic relationship" with Israel and with its recent misadventures in the region, will find it very difficult to do more than react to Soviet moves.

In several months of 1987 the Soviet Union undertook initiatives whose outcome will project Soviet influence further into the Persian Gulf at some loss of influence to the U.S.

They included:

- Soviet discussions with Israel on a variety of topics, including the issue of an international conference to begin Arab-Israeli talks.
- A Soviet offer to reduce the cost to Egypt of repayment for past military assistance at a time when the U.S. has not been able to do likewise, despite repeated Egyptian requests.
- A Soviet offer to provide protection for Kuwaiti oil shipments by leasing Soviet flag tankers to Kuwait.
- Recurring rumors that the Soviet Union will press its campaign for formal diplomatic relationships with all countries in the gulf, especially Saudi Arabia."

In contrast to those Soviet initiatives, the U.S. was not known to have had any of its own. Even reflagging of 11 Kuwaiti oil tankers appeared to be in reaction to the Soviet offer.

Table 4

What's ahead for supply/demand

	$12/bbl		$20/bbl	
	Non-Communist demand	OPEC supply	Non-Communist demand	OPEC supply
	Million b/d			
1987	47.6	20.0	46.3	17.6
1988	48.3	23.5	47.1	18.7
1989	49.0	25.0	48.0	20.0
1990	50-51	27.0	49.0	21.0

Source: Chase Econometrics

The Soviet initiatives did not appear to threaten any U.S. interests, at least in the short term. Collectively they seemed to serve the interests of the Middle East states, including Egypt.

Of the four Soviet moves, the one involving protection of shipping bound to or from Kuwait showed the most immediate importance. Iran, Saudi Arabia, other gulf states, and Kuwait frequently have asked that both superpowers leave the gulf to gulf states. Now, Kuwait appeared to wish for Soviet and U.S. presence without having to choose between them.

Iranian attacks on tankers bound to or from Kuwait precipitated the Kuwait request, to which the Soviet Union responded.

What made the Soviet response to the Kuwaiti request particularly interesting was that the Soviet Union openly took sides against Tehran.

The Soviet offer to protect shipping from Iranian attack may have signaled a decision to let gulf Arabs know that the Soviet Union is ready to act in its own interests. If so, it was an interesting signal, given the geopolitical significance the Soviet Union and the U.S. have placed on an Iranian connection.

There is no doubt that the U.S. has a very large naval advantage over the Soviet Union in the region and could provide better protection for shipping.

The offer by the Soviet Union to increase its role in an area long declared of vital interest to the U.S. and its allies and to do so in a manner involving the security of oil passage through the gulf carried with it the potential for dramatic changes in superpower relations in the region, the Conant publication said.

What if the war ends?

Despite efforts of the United Nations to end the war between Iran and Iraq, the conflict continued with no letup as 1987 drew to an end. Even so, petroleum analysts assessed the likely effect on oil markets if peace broke out in the Persian Gulf.

One such analyst was Salomon Bros.' Mlotok.

"We would expect the initial market reaction to be fears of substantial new supplies and a corresponding drop in oil prices," Mlotok wrote in a September 1987 Salomon Bros. newsletter. "In fact, though, we expect that an end to the war would result in more stable oil markets and better control of supply."

The Persian Gulf states were spending about $20-25 billion/year to pursue the war. That was equal to 3.5 million b/d of oil exports from the region or about 20% of total OPEC production.

An end to the war would reduce that phenomenal drain on finances of gulf OPEC states, allowing more considered,

IPE
ATLAS

NORTH AMERICA

UNITED STATES

CAPITAL: Washington, D.C.
MONETARY UNIT: Dollar
REFINING CAPACITY: 15.697 million b/d
PRODUCTION: 8.296 million b/d
RESERVES: 26.889 billion bbl

THE U.S. PETROLEUM INDUSTRY ENTERED 1988 STILL trying to shake off the effects of the 1986 oil price collapse.

Profits of a group of the biggest companies in 1987 were essentially flat with those of 1986. Stock values were down because of an October 1987 wave of panic selling on Wall Street and other financial centers in the U.S. and abroad. Personnel layoffs continued.

Oil and gas reserves were declining. Increased imports were filling a steadily widening gap between oil production and consumption. A persistent surplus of gas kept wellhead prices low. Another round of proposed environmental rules worried refiners and gas processors.

Petrochemicals accounted for one bright spot in the industry. And operators in the Gulf of Mexico were advancing deepwater production technology.

Rebounding oil prices hiked profits 3.3% to $9.38 billion in

Price slide cuts reserves value 1

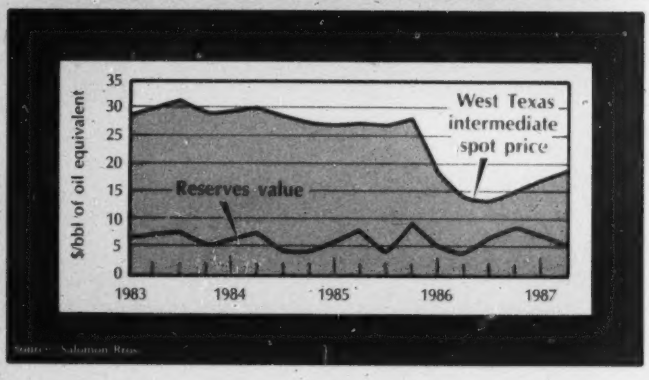


Table 1

U.S. production and reserves

	Production	Yearend reserves	Net change from prior year
		Million bbl	
CRUDE OIL			
1980	2,975	29,805	−5
1981	2,949	29,426	−379
1982	2,950	27,858	−1,568
1983	3,020	27,735	−123
1984	3,037	28,446	+711
1985	3,052	28,416	−30
1986	2,970	26,889	−1,527
NATURAL GAS		bcf	
1980	18,699	199,021	−1,976
1981	18,737	201,730	+2,709
1982	17,506	210,512	−218
1983	15,788	200,247	−1,265
1984	17,193	197,463	−2,784
1985	15,985	193,369	−4,094
1986	15,610	191,586	−1,783
NATURAL GAS LIQUIDS		Million bbl	
1980	731	6,728	+113
1981	741	7,068	+340
1982	721	7,221	+153
1983	725	7,901	+680
1984	778	7,643	−258
1985	753	7,944	+301
1986	738	8,165	+221

Source: Energy Information Administration

1987's first 9 months for the Oil & Gas Journal group of 24 U.S. oil companies. The increase stemmed from a big gain in the group's third quarter net income, which more than doubled from third quarter 1986 to $3.355 billion.

The number of companies showing losses for the first 3

Table 2

How world oil and gas reserves fell for 30 companies

	1979	1980	1981	1982	1983	1984	1985	1986	1979-86 composite growth, %
				Million barrels of oil equivalent					
Amerada Hess	1,258	1,190	1,194	1,128	1,073	1,012	1,006	781	(6.6)
Amoco Corp.	4,860	4,929	5,167	5,150	5,164	5,152	5,292	4,986	0.4
Anadarko Petroleum	272	260	239	247	250	257	274	313	2.0
Atlantic Richfield	4,934	4,954	4,917	5,208	5,240	5,455	4,108	4,076	(2.7)
Chevron Corp.	6,030	5,878	5,728	5,690	5,742	5,783	5,152	4,800	(3.2)
Conoco	2,768	2,633	2,015	1,861	1,836	1,868	1,860	1,467	(8.7)
Enron	—*	286	283	239	294	315	285	291	—*
Enserch	141	149	155	53	155	196	216	231	7.3
Exxon	10,980	11,603	10,788	11,126	11,358	11,438	11,687	11,417	0.6
Kerr-McGee	283	306	293	280	283	258	259	226	(3.2)
Louisiana Land	237	221	221	232	229	236	222	212	(1.6)
Maxus Energy Corp.	263	277	299	293	272	299	283	288	1.3
Mesa	192	205	219	290	285	366	391	418	11.7
Mitchell Energy & Development	149	177	200	204	216	214	206	195	3.9
Mobil	5,459	5,603	6,321	6,135	6,225	6,094	5,814	5,873	1.0
Murphy	320	277	267	266	262	253	240	213	(5.7)
Occidental	1,885	1,758	1,642	1,566	1,342	1,445	1,353	1,225	(6.0)
Pennzoil	300	294	291	326	313	292	326	301	0.0
Phillips	2,573	2,205	2,042	2,014	2,169	2,129	1,877	1,760	(5.3)
Royal Dutch/Shell	9,226	9,129	9,138	8,932	10,282	10,791	10,803	10,843	2.3
Sabine Corp.	56	59	62	41	29	34	35	32	(7.7)
Santa Fe So. Pacific	164	170	168	169	169	167	164	156	(0.7)
Standard Oil	5,000	4,776	4,535	3,921	3,859	4,065	3,851	3,624	(4.5)
Sun	1,423	1,509	1,442	1,389	1,348	1,431	1,377	1,282	(1.5)
Tenneco	817	812	984	948	948	960	1,049	979	2.6
Texaco	7,173	6,526	6,342	5,924	5,612	4,847	4,473	4,191	(7.4)
Texas Eastern Corp.	347	398	209	298	283	281	275	245	(4.8)
USX	1,966	1,993	1,940	1,831	1,919	1,928	1,978	1,605	(2.9)
Union Pacific	365	421	476	490	494	495	496	445	2.9
Unocal	1,984	1,923	2,070	1,937	1,917	1,885	1,918	1,894	(0.7)
Total	**71,427**	**70,925**	**69,651**	**68,340**	**69,569**	**69,647**	**67,273**	**64,369**	**(1.5)**

*Not available.
Source Salomon Bros.

effect since 1979 by combining the reserve data of the firms for the entire period. The 30 companies accounted for about two thirds of U.S. oil reserves.

In 1985, the group's U.S. oil reserves fell 1% from 1984. Its average decline in 1979-86 was 2%/year. In 1986, only three companies boosted U.S. oil reserves from 1985. During 1979-86 ten companies hiked reserves, eight of which had increases of more than 5%.

U.S. gas reserves for the 30 companies fell 1.7% to 103.2 tcf, or about 55% of the nation's total. That compares with an 8.9% drop in 1985 when ARCO downgraded its 8.3 tcf of Alaskan North Slope gas—rendered uneconomic by lower gas prices—to a resource from a reserve. Only nine companies increased U.S. gas reserves in 1986, only three of which rose more than 5%.

Non-U.S. crude and liquid reserves slid 9.4% in 1986.

Year to year figures varied more for non-U.S. reserves than those in the U.S. because of nationalizations, new fiscal arrangements, and more large reserve revisions or discoveries, Salomon Bros. said.

Foreign gas reserves for the group rose 1.5% during the 8 year period. The group's non-U.S. gas reserves increased 2% in 1986.

Combined worldwide oil and gas reserves fell 4.3% in 1986 after dropping 3.8% in 1985. That compares with an average dip of 1.5%/year since 1979.

Only five of the 30 reported higher combined oil and gas reserves in 1986 than in 1985.

Until 1986, the Salomon Bros. group's rate of U.S. oil production replacement had been improving. During 1979-86, the group averaged 52% replacement of production through exploration and development.

That rate rises to 74% with inclusion of revisions and purchases. In 1979, the replacement rate from all sources was only 33%. By 1985, that figure had jumped to 91%.

What's needed, said Salomon Bros. analysts, are higher crude prices to stimulate enhanced oil recovery operations. U.S. crude reserve additions linked to EOR projects rose to 587 million bbl in 1986 from 178 million bbl in 1979. In 1986, EOR accounted for half of the group's total reserve additions. Additions from extensions and discoveries averaged a steady 600 million to 1 billion bbl/year during 1980-85.

"Thus essentially all of the 1980-85 pickup in the industry's oil replacement rate had come from better recovery of known petroleum resources rather than from discovery of new reserves," Salomon Bros. said.

That presages further declines in the U.S. oil production replacement rate because the oil price collapse shelved or killed many EOR projects. Salomon Bros. said oil prices must rebound to $25/bbl before EOR in the U.S. will be revived. In the 8 years covered by the New York firm's study, only two companies in the group fully replaced U.S. oil production through drilling and EOR. Figuring revisions and purchases, that total grows to 12.

Improvements in the U.S. gas production replacement rate also are reversing. Excluding ARCO's massive revision, the group's 1985 rate would have been 78% from all sources. In 1986, the rate was 79%, down from 108% in 1984 but up from 53% in 1979.

"Gas prices are too low to stimulate drilling at this time,"

Table 3

Breakout of the U.S. land rig fleet by capacity and category

Region	Depth capacity (Ft)	Category* 1	2	3	July 1987 Total	Oct. 1986 Total
Rocky Mountains	0-4,999	25	2	4	**31**	**34**
	5,000-9,999	111	29	8	**148**	**142**
	10,000-14,999	114	8	7	**129**	**207**
	15,000+	125	8	9	**142**	**171**
Permian basin	0-4,999	58	17	6	**81**	**71**
	5,000-9,999	193	64	15	**272**	**401**
	10,000-14,999	145	53	16	**214**	**255**
	15,000+	72	22	18	**112**	**123**
Texas Gulf Coast	0-4,999	22	9	2	**33**	**48**
	5,000-9,999	94	18	4	**116**	**114**
	10,000-14,999	94	41	10	**145**	**177**
	15,000+	76	29	7	**112**	**128**
Northeast	0-4,999	92	21	1	**114**	**177**
	5,000-9,999	193	40	6	**239**	**225**
	10,000-14,999	17	5	0	**22**	**19**
	15,000+	24	0	0	**24**	**13**
Southeast	0-4,999	13	0	0	**13**	**7**
	5,000-9,999	31	7	0	**38**	**32**
	10,000-14,999	51	7	2	**60**	**54**
	15,000+	131	19	2	**152**	**159**
Ark-La-Tex	0-4,999	43	13	10	**66**	**54**
	5,000-9,999	88	14	5	**107**	**139**
	10,000-14,999	92	9	1	**102**	**126**
	15,000+	48	7	0	**55**	**42**
Midcontinent	0-4,999	67	27	16	**110**	**96**
	5,000-9,999	173	25	42	**240**	**404**
	10,000-14,999	170	39	20	**229**	**230**
	15,000+	169	97	51	**317**	**215**
Pacific	0-4,999	37	9	3	**49**	**56**
	5,000-9,999	23	3	6	**32**	**32**
	10,000-14,999	21	3	22	**46**	**31**
	15,000+	26	1	36	**63**	**43**
Total by category	**0-4,999**	**357**	**98**	**42**	**497**	**483**
	5,000-9,999	**906**	**200**	**86**	**1,192**	**1,489**
	10,000-14,999	**704**	**165**	**78**	**947**	**1,099**
	15,000+	**671**	**183**	**123**	**977**	**894**
July 1987 Total		**2,638**	**646**	**329**	**3,613**	—
Oct. 1986 Total		**3,054**	**762**	**149**	—	**3,965**

*1 market ready, 2 temporarily stacked, 3 permanently stacked.
Source: International Association of Drilling Contractors

reserves, Strevig said.

The activity reflected anticipation that depressed gas prices had significant potential for high return on investment not anticipated in oil. Contributing factors were misleading speculations of the deterioration and imminent elimination of the gas bubble, continued surplus of Canadian imports due to relaxed rules on exports to the U.S., and continuing producer consolidations, Strevig said.

An unprecedented increase in the volume of transactions in the third quarter was related to continued producer efforts to cut costs, divest marginal properties, and improve efficiency. The transactions ranged in size from $215,000 to $650 million and included purchases of working and royalty interests and company mergers or acquisitions.

The values for reserve acquisitions ranged from $19.62/boe to $1.03/boe.

Land rig fleet still shrinking

Attrition continued to pare the U.S. land rig fleet in 1987, but the number of marketable rigs was still more than double the number working from week to week. The fleet of marketable land rigs in the U.S. shrank nearly 14% between October 1986 and July 1987 (Table 3).

U.S. contractors had 2,638 market ready rigs, down 13.6% from October 1986, according to an August 1987 survey conducted by the International Association of Drilling Contractors and Smith International Inc.

The number of temporarily stacked rigs, 646, was down 15.2% from the October 1986 survey. IADC and Smith also found more than twice the number of permanently stacked rigs in the latest survey than it did in October 1986. The 3,613 rigs identified was down 8.9%. IADC-Smith received

Land rig in action near Laredo, Tex., for Enron Corp.

value of U.S. exports rose by 14% through September. But that gain was more than offset by rising volumes and higher prices of oil imports.

At a level of 40% of U.S. demand, up from 30% a year earlier, oil imports were estimated to cost the U.S. about $50 billion in 1987, a jump of $16 billion from 1986.

Table 4

17 years of U.S. drilling activity

	Rig count	Wells drilled	Footage (1,000 ft)	Footage/ well	Wells/ rig	Footage/ rig
1971	976	26,268	127,256	4,845	26.91	130,385
1972	1,107	27,934	138,797	4,969	25.23	125,381
1973	1,195	27,692	139,425	5,035	23.17	116,673
1974	1,471	33,370	153,776	4,655	22.46	104,539
1975	1,660	38,884	181,040	4,656	23.42	109,060
1976	1,656	40,940	187,290	4,575	24.72	113,098
1977	2,001	45,855	215,696	4,704	22.92	107,794
1978	2,255	50,061	238,386	4,762	22.20	105,715
1979	2,176	51,890	243,685	4,696	23.85	111,988
1980	2,910	69,486	311,445	4,482	23.88	107,026
1981	3,970	89,234	406,520	4,556	22.48	102,398
1982	3,105	83,889	375,383	4,475	27.02	120,896
1983	2,232	75,738	316,617	4,180	33.93	141,854
1984	2,428	84,983	368,796	4,340	35.00	151,893
1985	1,980	71,539	318,178	4,448	36.13	160,696
1986	964	42,387	191,272	4,513	43.97	198,415
1987*	935	37,500	176,700	4,712	40.11	188,984

*Oil & Gas Journal estimates.

Source: Rig count, Baker Hughes Inc.; well count, American Petroleum Institute.

Table 5

Comparison of production estimates for EOR

	1986	1990	1995	2000
	1,000 b/d			
LOWER PRICES				
Lower price track* ($12-21/bbl)				
Thermal	490	380	330	330
Miscible	60	70	100	130
Chemical	10	20	30	30
Total	**560**	**470**	**460**	**490**
1984 constant $20/bbl track†				
Thermal	570	600	510	380
Miscible	70	130	180	190
Chemical	40	30	60	90
Total	**680**	**760**	**750**	**660**
HIGHER PRICES				
Upper price track* ($12-36/bbl)				
Thermal	510	490	570	700
Miscible	70	140	260	370
Chemical	10	30	50	40
Total	**590**	**660**	**880**	**1,110**
1984 constant $30/bbl track†				
Thermal	610	670	680	620
Miscible	100	250	380	480
Chemical	70	60	100	100
Total	**780**	**980**	**1,160**	**1,200**

*Lower 48, onshore only. †Includes onshore, offshore, and Alaska.

Source: Lewin & Associates Inc. and U.S. Department of Energy

API figures showed crude oil imports of 7.1 million b/d near year-end 1987, only a little less than the recent-year record of 7.4 million b/d in July 1987.

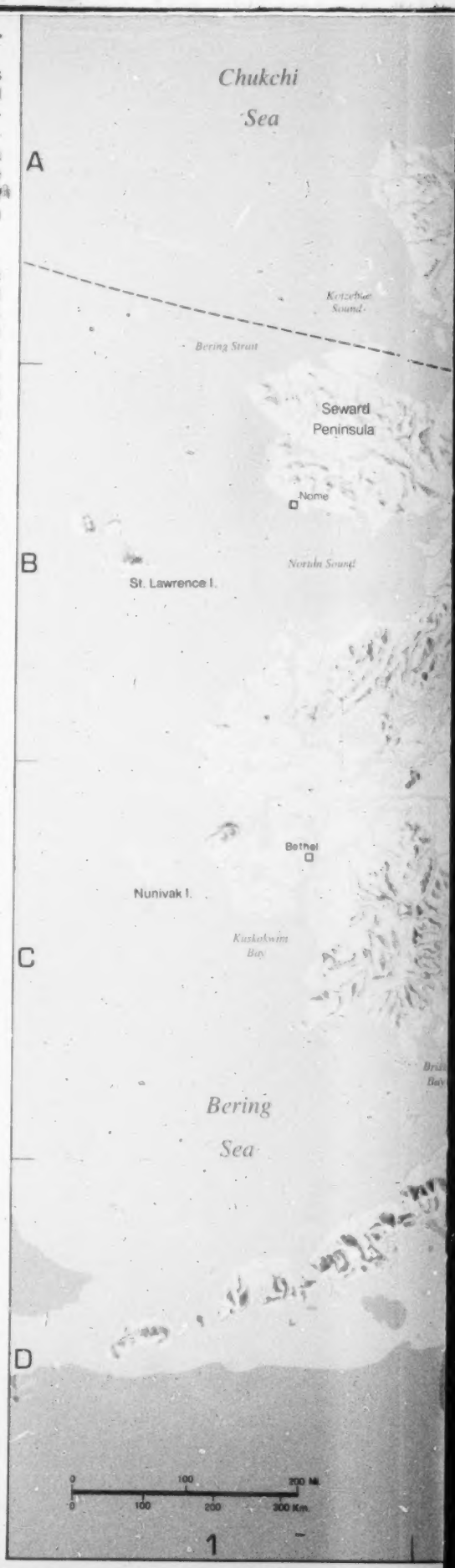
API Pres. Charles DiBona said at current trends, within 3-5 years OPEC will once again be producing at 80% of capacity and will be able to boost oil prices abruptly. At any time before then, a disruption in supplies such as closure of the Persian Gulf to tanker traffic could spawn a crisis.

The U.S. was about 6% dependent on Persian Gulf oil, much less than western Europe's 30% or Japan's 50%.

Also in December, a group of U.S. oil companies and associations asked the Commerce Department to determine whether rising oil imports threaten national security. It did not directly ask for an oil import fee, import price floor, or quota system, although the Reagan administration had those options.

The group, led by Enserch Corp., Dallas, filed its request under Section 232 of the 1962 Trade Expansion Act. It asked Commerce to study the oil import situation and recommend possible remedies. The President will decide what action, if any, to take. Commerce has 1 year to complete the study.

Ten independent producers



The Canadian industry's 5-year financial summary

	1982	1983	1984	1985	1986
			Billion Canadian $		
REVENUES					
Total operations*	57.0	59.1	62.9	66.0	47.1
Domestic upstream	21.0	23.9	26.4	27.6	16.7
Domestic downstream	31.3	30.7	31.9	34.1	26.4
NET INCOME					
Total operations*	1.8	1.5	3.7	2.8	(2.5)
Domestic upstream	2.1	2.5	3.1	2.9	(1.7)
Domestic downstream	0.4	(0.1)	0.4	0.2	0.8
INTERNAL CASH FLOW					
Total operations*	7.4	8.6	10.5	11.3	7.4
Domestic upstream	5.8	7.3	8.3	9.3	5.1
Domestic downstream	1.3	0.8	1.1	1.1	1.6
CAPITAL EXPENDITURES					
Upstream	6.4	6.8	7.8	9.1	6.0
Downstream	2.2	1.6	0.9	0.8	0.7
Other	1.9	1.2	0.9	0.9	0.5
Total in Canada	**10.5**	**9.6**	**9.6**	**10.7**	**7.2**
Foreign	1.1	0.7	0.6	1.1	0.4
Total	**11.6**	**10.3**	**10.2**	**11.8**	**7.7**

*Includes other Canadian and foreign operations.

Source: Petroleum Monitoring Agency

exports could cause difficulty in meeting Canadians' gas requirements.

NEB outlined plans to act in two ways to ensure that gas exports are surplus to Canadian needs. It will hold hearings to consider applications for export permits, and it will monitor the market closely.

The hearing process will allow Canadian consumers to complain to the board that they cannot obtain additional gas supplies under contract terms and conditions, including prices, similar to those in export proposals.

The trade agreement required approval by Canada's Parliament and provinces and the U.S. Senate.

Details were not disclosed, but an announcement sketched the general terms.

"Both sides have agreed to prohibit restrictions on imports or exports, including quantitative restrictions, taxes, minimum import or export price requirements, or any other equivalent measure, subject to very limited exceptions.

"They will consult on energy regulatory actions that would directly result in discrimination inconsistent with principles of the free trade agreement.

"With respect to existing measures, Canada has agreed to eliminate several practices that discriminate against energy exports to the U.S., and the U.S. has agreed to eliminate various import restrictions and to allow Canada access to crude oil from Alaska's North Slope, subject to certain conditions."

Alaskan oil exports will be limited to 50,000 b/d carried in U.S. flag tankers, sources said.

Oil and gas reserves show little change

The Canadian Petroleum Association's annual report on reserves showed very little change in natural gas and conventional crude oil and equivalent volumes. However, the totals, taken by themselves, masked some disturbing facts.

CPA estimated Canada's reserves of crude oil and equivalent at 6.8 billion bbl at yearend 1986, up 1.6% from yearend 1985.

Much of the increase came from a 56.2% gain in frontier areas to 1.1 billion, including 409 million bbl booked for the first time in the Beaufort Sea, where full scale production was only tentatively scheduled for the mid-1990s. Oil reserves in conventional areas fell 4.3% to 4.84 billion, and those in the western provinces declined 5.2% as only 35% of 1986 production was replaced.

Developed nonconventional oil resources—synthetic crude oil and bitumen—increased about 4% to 2.6 billion bbl in 1986.

CPA pointed out that those reserves were equal to 46% of conventional crude reserves in the western provinces and 37.7% of Canada's total established conventional crude reserves.

Combined conventional and nonconventional oil reserves were estimated at 9.4 billion bbl, up 2.2% from yearend 1985.

CPA pegged reserves of marketable natural gas at 97.4 tcf, down 1.4% from yearend 1985. The volume in conventional producing areas stood at 73.4 tcf, down 1.8%, and in frontier regions at 24 tcf, up marginally. Gross additions in 1986 amounted to 1.4 tcf, about half of net production of 2.7 tcf.

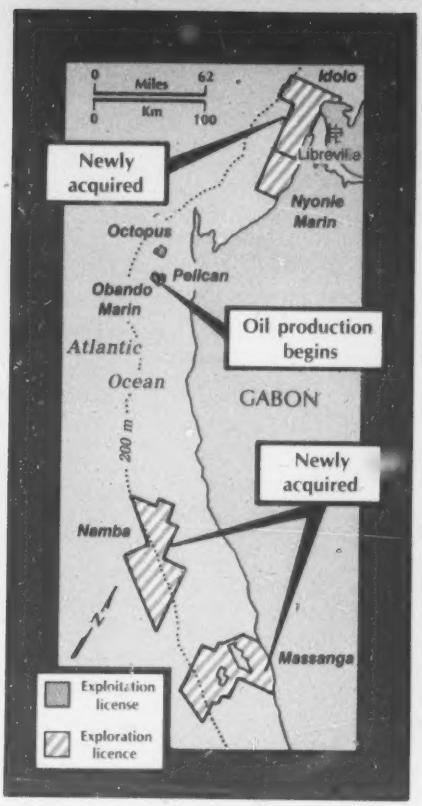
Well completions probably will amount to little more than 6,000 when all figures are in for 1987, chalking up a 4% gain from 1986 but far off the record 12,297 wells drilled in 1985.

As usual, Alberta will account for most of Canadian drilling—about 60-75% of total wells during the 1980s, for example.

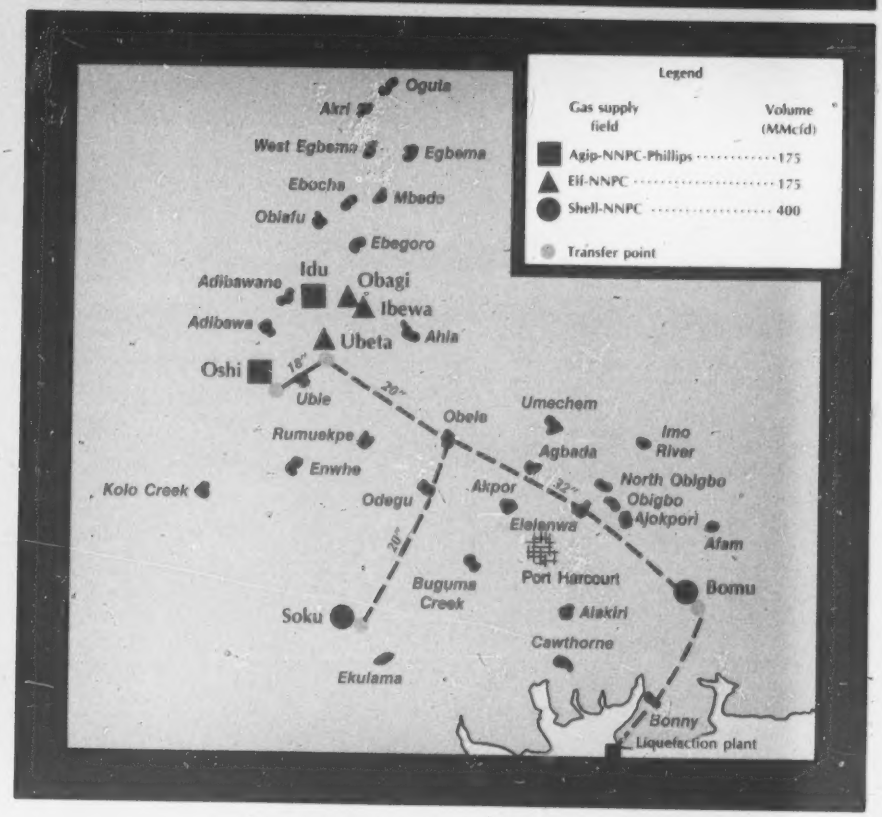
But Saskatchewan could see its share of well completions increase from its usual 20-30%. The province, with its open door marketing policies, was becoming more attractive for industry.

Approval of direct gas sales and improved royalty and export rules were drawing shallow gas drillers to Southwest Saskatchewan, where Alberta's large Medicine Hat field trends across the border into Saskatchewan's Hatton area. In Southeast Saskatchewan, explorers were finding success in a geologically difficult but rewarding Devonian reef deep oil play. PE

Tenneco blocks



What the Nigerian LNG project calls for



cal aspects, financing, and shipping.

At the end of 1987, the project was controlled by a working committee made up of representatives from all participants. In 1988 the LNG project company was to be set up. It will be responsible for gas transmission, liquefaction, and shipping.

Gas supply

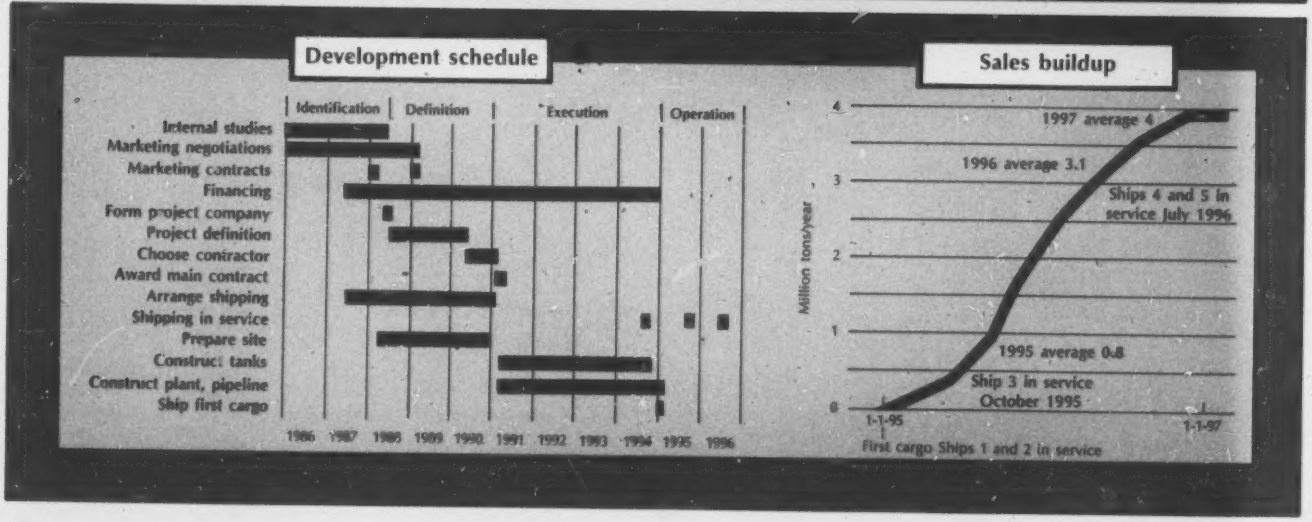
The 4.5 tcf of gas needed for the project will come from onshore concessions in the east Niger River Delta.

Fields selected for gas supply are Oshi and Idu (Agip-NNPC-Phillips), Ubeta, Obagi, and Ibewa (Elf-NNPC), and Soku and Bomu (Shell-NNPC). The fields are dedicated to the LNG project and hold enough reserves to supply the entire life of the project.

Shell-NNPC will supply a little more than half of the 750 MMcfd of gas required for the plant. The rest will come equally from joint ventures operated by Elf and Agip.

Gas will be supplied at four transfer points into a transmis-

The timetable for Nigerian LNG export project



Breakout of Australian exploration activity

	1985	1986	1987
ONSHORE			
Wildcats	163	81	166
Appraisal wells	65	21	48
Total exploratory wells	**228**	**102**	**214**
Seismic surveys (line km)	48,683	20,869	17,000
Expenditures (million Australian $)	371	221	251
OFFSHORE			
Wildcats	21	20	11-13
Appraisal wells	15	9	5
Total exploratory wells	**36**	**29**	**16-18**
Seismic surveys (line km)	41,066	26,571	14,500
Expenditures (million Australian $)	402	279	130

Source: Australian Petroleum Exploration Association

Western Australia.

Challis is a 1984 discovery. Four wells in the field have each flowed more than 2,300 b/d. The 3 Challis delineation well flowed 9,989 b/d, a record gauge for Australia. Jabiru and Challis lie in the Bonaparte basin, about 391 miles west of Darwin. Jabiru, a 1983 discovery, has reserves of 35 million bbl and an expected life of 5-8 years.

Whiting oil field development

The Esso Exploration & Production Australia Inc.-Broken Hill Pty. Co. Ltd. partnership was to proceed with a $150 million (Australian) development project in Whiting oil field in Bass Strait.

The field, discovered in the early 1980s with reserves estimated at 21 million bbl, will be the smallest field developed in the region. Development will involve the Esso-BHP group's first installation of an unmanned miniplatform. The five well structure will hold equipment to pump oil to the nearby Snapper field platform for processing. The other 13 platforms in Bass Strait are manned structures that process their own oil and gas. Whiting development follows a reevaluation of Bass Strait fields after a 1987 federal government decision to exempt from excise tax the first 30 million bbl of production from new oil fields.

Esso-BHP was evaluating five other marginal Bass Strait discoveries. Viability assessments for Seahorse and Tarwhine oil fields were expected by the end of 1987. Decisions for Dolphin, Whiptail, and Perch were not to be made for another 12 months.

More than two thirds of Bass Strait's oil reserves have been produced, and it was estimated that three fourths of the total will be recovered by 1989.

South Pepper, North Herald development

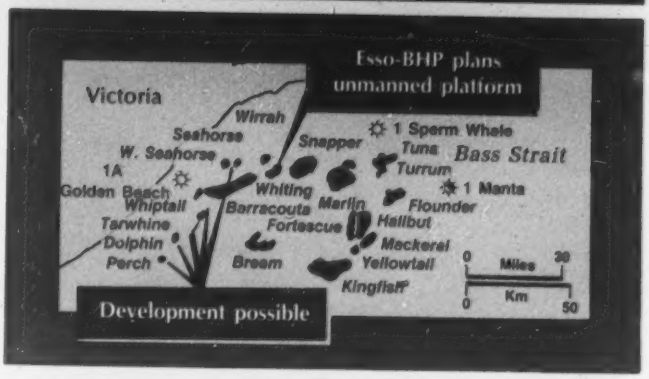
Development began in South Pepper and North Herald oil fields south of Barrow Island off Western Australia.

The Atwood Oceanics Inc. Vicksburg jack up arrived on site and will function as a production platform. It will be Australia's first such use of a jack up.

The fields, in 66 ft of water about 19 miles south of Barrow Island, hold reserves estimated at 4-6 million bbl of oil.

Production was to start at year-end 1987 at the rate of 8,000 b/d from five wells—four in South Pepper and one in North Herald. Start-up will coincide with Australia's decontrol of prices on domestic oil production.

New action in Australia's Bass Strait



Mereeni field development drilling

The Moonie Oil Co.-Magellan Petroleum Australia combine plans development drilling to revive flow to 3,500 b/d from the current 2,800 b/d in Mereenie oil and gas field in Australia's Amadeus basin. It was to begin a 120 line km seismic survey of the western end of the field in the fall of 1987. The survey was to identify targets for a 1988 drilling program.

Interest in the field revived after a well fracture/gas reinjection program halted a production slide stemming from problems in the complex reservoir.

Work program bidding

Australia opened modified work program bidding for 11 areas on its continental shelf.

On offer was one area in the Sydney basin off New South Wales, one area in southern Gippsland basin off Tasmania, four areas in the Carnarvon basin and one in the Browse basin off Western Australia, and one area in the Bonaparte basin and three in the Arafura Sea off Northern Territory.

Deadline was year-end 1987 for applications to be filed with mines departments in relevant states. Applicants for the 6 year exploration permits were required to nominate a guaranteed minimum "dry hole" exploration program for each of the first 3 years of the permit term and a "secondary" program for the remaining 3 years.

Rough Range exploration

Ampol Exploration Ltd. and partners reopened exploration at the site of Australia's first post-World War II oil discovery in Western Australia's Rough Range region.

Ampol and Caltex Australia Ltd. drilled the 1 Rough Range discovery in 1953. Of 10 wells drilled on the Rough Range structure during 1953-55, it was the only well to flow oil and was considered noncommercial.

Ampol operates the permit, EP41, covering most of the narrow peninsula in Exmouth Gulf on the country's central west coast. The company thinks it will need to prove up 1-3 million bbl of oil reserves to make development commercial.

It reentered 1 Rough Range and determined that the well can flow at rates of as much as 1,000 b/d from the Cretaceous Birdrong. It also has shot seismic surveys indicating several undrilled structures south of the discovery.

Gippsland basin permits

Successful bidders proposed to spend a total of about

Cauvery basin discoveries

Well	Depth (ft)	Type of discovery	Date of discovery
ONSHORE			
1 Karaikal	5,810	Oil	Feb./Mar. 1985
10 Karaikal	5,486	Oil	June/July 1976
1 Madnam	5,531	Gas	Sept. 1969
1 Kovilkallapal	5,794	Oil	Jan. 1985
1 Narimanam	7,615	Oil/gas	July 1985
2 Narimanam	7,011	Oil	Jan. 1987
4 Kovilkallapal	5,741	Oil	Apr. 1987
OFFSHORE			
PY-1-1	5,594	Gas	July 1980
PY-1-2	5,741	Gas	Aug. 1980
PY-1-4	6,568	Oil/gas	Sept. 1982
PY-1-5	8,373	Gas	Nov./Dec. 1982
PY-3-1	11,581	Gas	Sept./Oct. 1980
PH-9-1	11,237	Oil	Aug. 1981

Source: Petroleum Ministry

Start-up of the $489.6 million, 890,000 ton/year, natural gas fed Chittagong plant boosts Bangladesh's fertilizer capacity to 1.6 million tons/year.

A production sharing contract in the area of Bangladesh's first oil discovery ran into trouble. Floods and political unrest delayed signing of the pact between state owned Bangladesh Oil & Gas Minerals Corp. (Bogmc) and Scimitar Oils Ltd. SA, Dubai.

The 18 year agreement in principle covers drilling of six wells in the 637 sq mile Surma basin area, excluding the discovery, Bogmc Haripur 7.

Opponents to Bangladesh Pres. Hussain Muhammad Ershad say a foreign company should not be allowed to develop the discovery. Bangladesh placed its first oil discovery on production and wanted to drill four or five appraisal wells.

Bogmc's 7 Haripur began producing 450 b/d of waxy crude, which is carried 12 miles by truck to Sylhet and 185 miles by rail to the country's only refinery, Eastern Refinery Ltd.'s 31,200 b/d facility at Chittagong.

The state-owned company made the Surma basin discovery at year-end 1986.

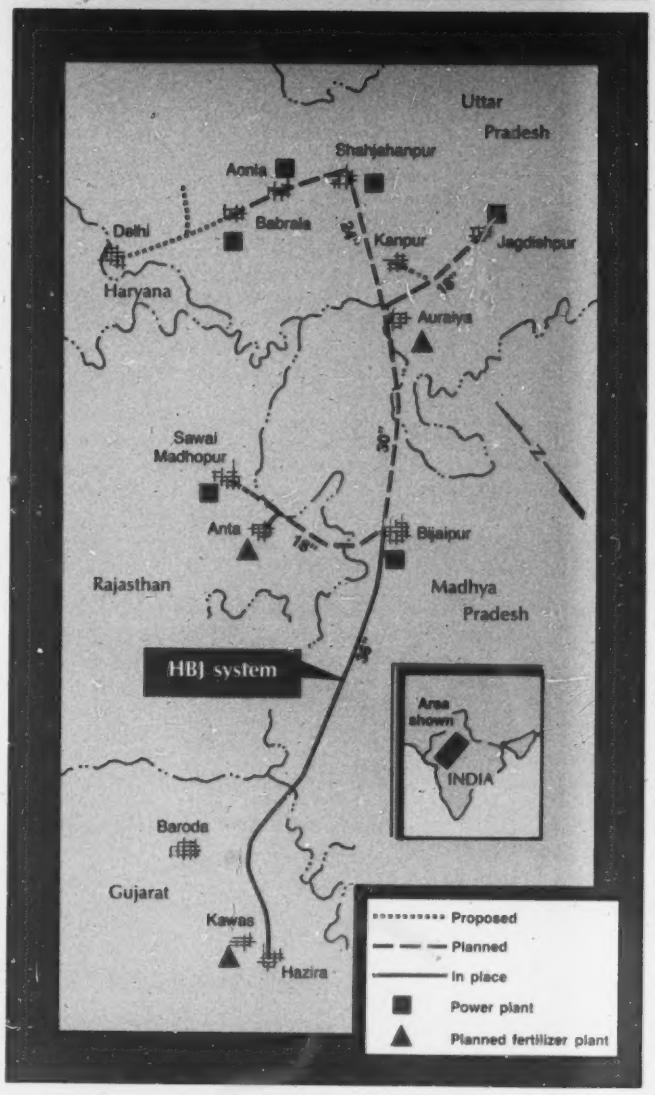
Production was from 6,670 ft.

The 8 mile by 2 mile structure is bounded on the north by the regional Dauki fault and on the east by one of the country's 13 natural gas fields. IPE

INDIA

CAPITAL: New Delhi
MONETARY UNIT: Rupee
REFINING CAPACITY: 1,058,742 b/cd
PRODUCTION: 608.7 Mb/d
RESERVES: 4,250,000 Mbbl

Proposed segments



RECENT OIL AND GAS DISCOVERIES HAVE RAISED hopes in India's Petroleum Ministry that the Cauvery basin soon can become a major contributor to the country's production.

An example of one of those finds is state owned Oil & Natural Gas Commission's first strike in the Ariyalu-Pondicherry subbasin about 6 miles northwest of Chidambaram in Tamil Nadu. The 2 Bhuvanagiri flowed 206 b/d of oil and 1.8 MMcfd of gas.

Plans call for production of nearly 500,000 metric tons/year by the end of 1990 from Cauvery basin, in Tamil Nadu in the far southeast.

India's main producing areas at present are at Bombay High, Cambay, and Upper Assam.

About 30 onshore wells and 19 offshore wells have been drilled in the Cauvery basin. There have been about seven oil or gas discoveries onshore and six offshore. Early production schemes have brought wells on stream on the Narimanam and Kovilkallappal structures.

ONGC 1 Narimanam has produced about 55,000 bbl of oil since February 1986. The 3 Narimanam has produced about 180 b/d of oil and 219 Mcfd of gas since early summer 1987.

Two of four wells on the Kovilkallappal structure have

Where Argentina offered third round tracts

Area	Name	Size (Sq km)
NORESTE BASIN		
CNE-6	Rivadavia	8,645
CNE-7	La Fragua	9,146
CNE-8	Monte Quemado	9,892
CNE-9	El Cabure	10,000
CNE-14	Sachayoj	10,000
CNE-15	Pampa del Infierno	9,987
CNE-16	Oeste Rio Bermejo	10,000
CNE-18	Campa Gallo	10,000
CNE-26	Suncho Corral	10,000
CNE-27	Anatuya	10,000
CNE-28	Los Juries	10,000
CNE-29	Tostado	9,500
CNE-65	J.V. Gonzalez	8,080
CUYANA Y BOLSONES BASIN		
CCyB-6	Tamberias	4,500
CCyB-7	Media Agua	9,920
CCyB-8	Pampa de las Salinas	9,492
CCyB-9	Santa Rosa	7,694
CCyB-10	Rio Desaguadero	8,993
CCyB-11	Nacunan	6,111
CCyB-12	San Rafael	6,595
CCyB-14	General Alvear	6,816
NEUQUINA BASIN		
CNQ-6	Payun Norte	2,292
CNQ-8	Huatraico	4,800
CNQ-9	Huecu	5,214
CNQ-10	Chiuidos	4,477
CNQ-11	Las Lajas	5,704
CNQ-13	China Muerta	3,546
CNQ-16	Lago Pellegrini Este	1,860
AUSTRAL BASIN		
CA-9	Rio Turbio	5,788
COLORADO MARINA BASIN		
CCM-1		14,955

sions, YPF must declare the option within 45 days after the operator has gained government approval of a development plan.

Another revision involves natural gas prices. YPF has the option to buy all liquids and gas production. Under the revisions, YPF will pay for gas production at a price that could be as much as 27% of the world price of oil equivalent.

That is an increase from the previous ceiling of 14%.

For liquids production, YPF will continue to pay 70-80% of the international price of equivalent crudes. The exact level of compensation is a matter of negotiation during the bidding process.

Payment will be made with either Argentine currency or foreign currency in proportions established during the bidding process.

Contract phases

Contracts awarded under the program consist of three phases.

Under the first phase, operators have 3 years to complete their geological and geophysical work commitments in each contract area.

Upon completion of the first phase, operators will begin an exploratory drilling period, which consists of a minimum number of wells/year as agreed to in bids.

The exploration period lasts for 4 years, divided into four subunits of 1 year each.

YPF is authorized to extend the period 2 years.

If hydrocarbons are discovered, the operator has 1 year, which may be extended if justified by technical reasons, to evaluate and declare if the discovery is commercial. A declaration of commerciality enables the operator to enter the exploitation period.

Under the exploitation period, a development plan is negotiated with the government. If a plan is accepted, term of the production agreement is 20 years, subject to extension if warranted.

For gas discoveries, however, the government may suspend start of development for as long as 10 years, conditioned to such things as market demand and transportation capacity.

Hidra area development

A group led by Total CFP may develop more discoveries near Hidra oil field off Tierra del Fuego.

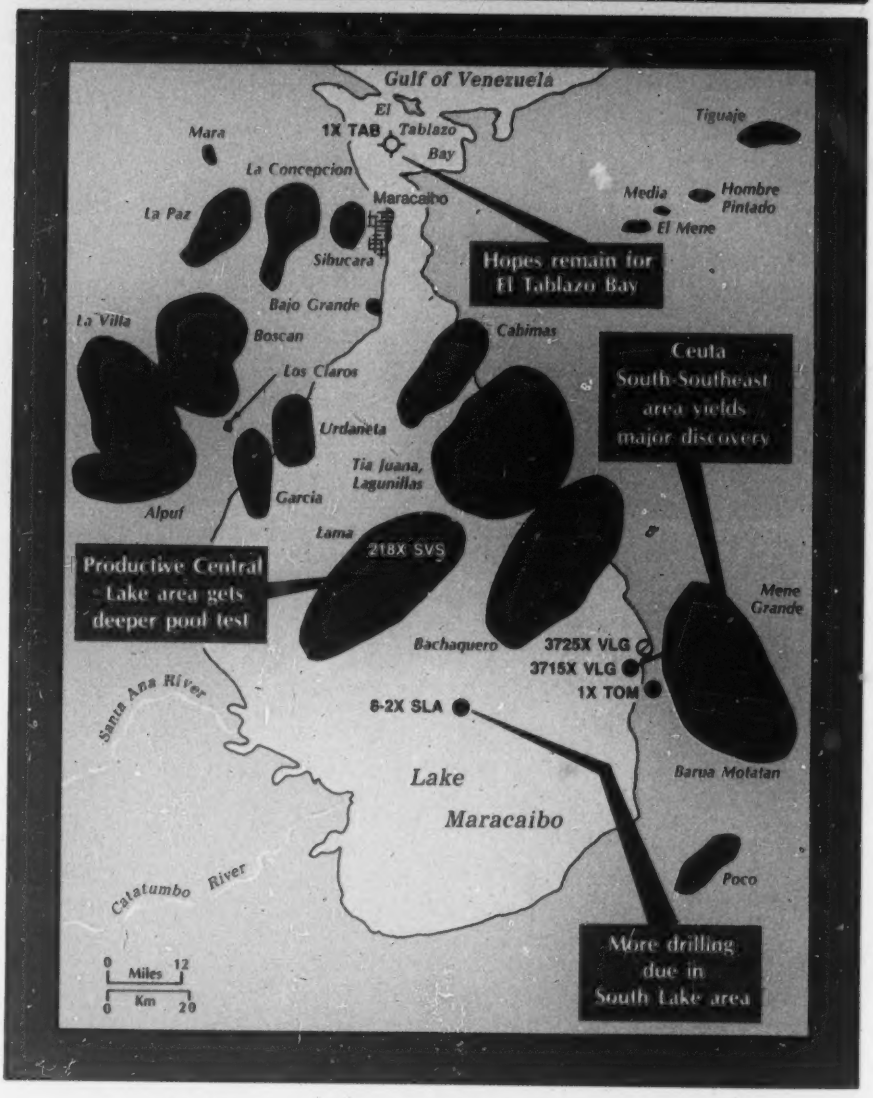
The group resumed exploration in in mid-1987 and completed technical studies on gas/condensate reservoirs south of Hidra field.

Hidra, to reach peak output of 27,000 b/d by 1990, was approved for a $250 million development plan

Pdvsa's 1988-93 spending plans

	Billion $
Production	5.300
Refining	1.460
Petrochemicals	1.260
Exploration	0.882
Domestic market	0.786
Overseas investments	0.779
Research/development and other areas	0.724
Coal	0.441
Total	**11.632**

Where Maraven is exploring in Lake Maracaibo



Lake Maracaibo exploration

Maraven SA is accelerating Lake Maracaibo exploration following a giant oil discovery in the Ceuta South-Southeast area.

The Pdvsa subsidiary estimates reserves in the new field at 800 million bbl of 20-36.5° gravity oil. It has drilled 11 wells in the area, the best gauging 2,000-5,000 b/d.

Maraven expected to be able to produce about 100,000 b/d from the field by 1988-89, rising to 120,000 b/d in the early 1990s.

It expects to drill at least six and as many as eight Lake Maracaibo wildcats during the next few years at an average cost of $5.3 million/well. It also could spud its first wildcat in the Andes foothills south of the lake in 1989.

Discovery well for Ceuta South-Southeast is Maraven 3715X VLG, drilled to 17,686 ft in the Eocene in September 1985.

The well flowed 4,600 b/d of oil through a ¾ in. choke. It tapped two pay zones as thick as 250 ft: Upper B with crude of 20-26° gravity and the Lower B with 36.5° gravity oil.

Another wildcat, Maraven 1X TOM, completed in 1987 onshore east of the 3715X VLG, flowed an average 2,000 b/d. Drilled to 16,524 ft, 1X TOM flowed 34° gravity oil from the Lower B and 26° gravity crude from Upper B. Drilling in the area included the 3725X VLG wildcat about 3½ miles north of the discovery well and three holes Maraven calls "advance" wells. The 3725X VLG, spudded in midyear 1987, had a target depth of 17,000 ft. Before the discovery, Maraven shot 1,323 line km of seismic surveys and conducted other geophysical surveys and geochemical studies in the Ceuta South-Southeast sector. In another part of Lake Maracaibo called South Lake, Maraven tested 4,500 b/d of 36° gravity oil with high water cut and some gas in 8-2X SLA. Pay is Cretaceous Cogollo group limestone and sands at about 18,000 ft. Before Venezuela nationalized its oil industry in 1976, a Mobil Corp. unit drilled the 8-1X SLA wildcat in the same area. The well did not reach the Cretaceous. In shallow waters of El Tablazo Bay, north of Lake Maracaibo, Maraven earlier in 1987 completed the 1X TAB wildcat. The well produced noncommercial volumes of 34° gravity oil. Maraven was evaluating data from the well and thinks the area may have potential. The company in 1987 spudded the 218X SVS deeper pool test in Lama oil field in Lake Maracaibo, reached the Guasare formation, and was temporarily halted. Target was the Cretaceous.

Enhanced oil recovery

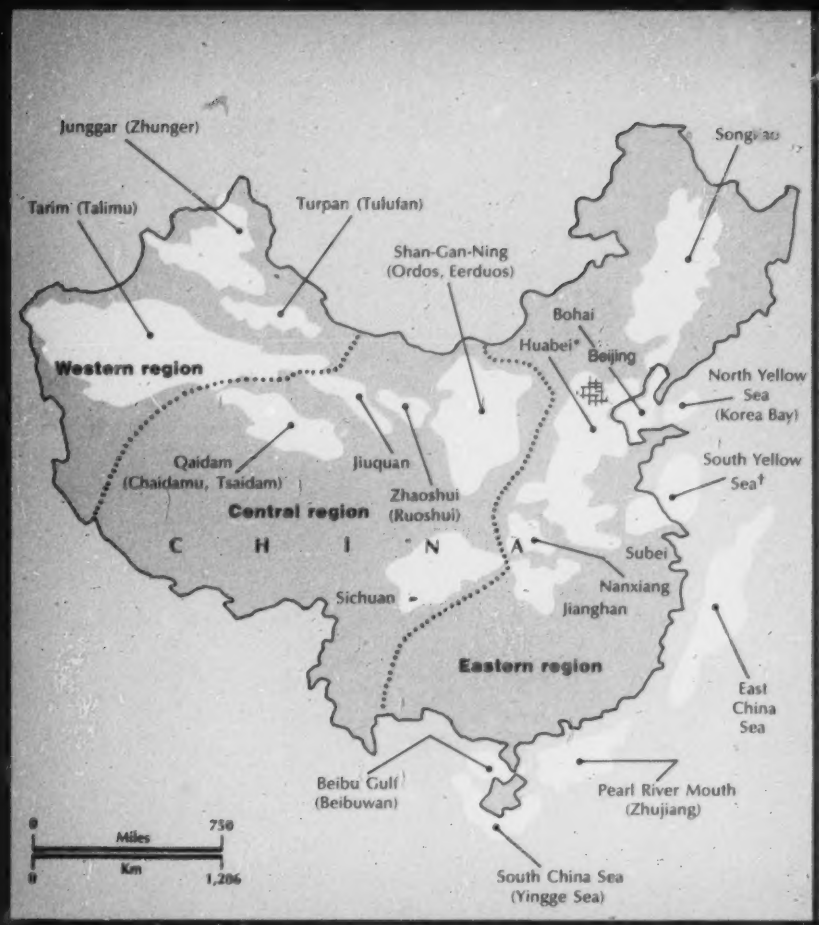
EOR could boost recovery production in existing Venezuelan fields by 20 billion bbl, says Fernando Sanches, production coordinator of Pdvsa. Venezuela has invested heavily in techniques to boost recovery of its huge heavy oil reserves. He bases his assessment on results of several projects.

For example, in Boscan oil field northeast of Lake Maracaibo, steam injection tests of the B-257 well, which produces asphaltic, 10.2° gravity crude, show that the field's potential production could jump to 180,000 b/d from 92,000 b/d. And at the M-6 steam drive project in Tia Juana field south of Boscan, injection of about 24 million tons of steam has boosted production by an estimated 17,000 b/d.

Tests in the Orinoco heavy oil belt in the west show promising results. In the Cerro Negro area, Pdvsa units have injected 40 cycles of steam, achieving production of as much as 2,000 b/d of heavy crude in some wells. IPE

Where China's major oil bearing basins lie

1



Oil production breakout

Field, year of discovery	1985	Cumulative to 1-1-86
	— 1,000 bbl —	
WESTERN REGION		
Junggar basin		
Karamay, 1955	—	107,822
Dushanzi, 1941	—	40,726
Other Junggar, Tarim,		
Turpan basin fields	36,281	391,886
CENTRAL REGION		
Jiuquan basin		
Yumen, 1938	4,360	199,434
Sichuan basin		
All fields	730	150,534
Shan-Gan-Ning basin		
Chang Qing, 1978(?)	10,220	82,559
Yancheng, 1907	876	57,571
Qaidam basin		
Qinghai, 1955	730	35,880
Lenghu 3, 4, 5, 1958	—	10,700
Other fields	—	92,548
EASTERN REGION		
Songliao basin		
Daqing, 1959	403,872	5,231,210
Fuyu, 1958	4,197	344,706
Jilin, 1978(?)	13,140	74,540
Bohai basin		
Shengli, 1962	202,320	1,921,996
Renqiu (Huabei), 1975	75,482	739,635
Liaohe, 1964	65,958	458,036
Dagang, 1964	23,360	357,167
Zhongyuan, 1981	37,741	111,359
Iiu, 1970	—	19,690
Jianghan basin		
Qianjiang, 1966	—	181,982
Other fields	7,300	104,379
Nanxiang basin		
Nanyang, 1971	16,060	130,885
Subei basin		
All fields	2,555	25,156
Total	905,200	10,760,283

*Southern onshore portion of Bohai basin. †Offshore extension of Subei basin.
Source: U.S. Energy Information Administration, Office of Oil and Gas

2000 until 2029, EIA figured. China could sustain production of 3 million b/d from 1990 until 2044 or at 3.5 million b/d from 1995 until 2035.

Whether that happens depends on large gains in production efficiency. Those production levels could be sustained if China is able to achieve and maintain a reserves to production ratio of 12.5:1.

China's 1987 ratio was 26:1. The U.S. ratio was 9:1.

EIA, using independent, field by field data, estimated China's yearend 1985 reserves at 23.6 billion bbl. Large areas of the country hold the potential for significant discoveries.

But efforts to analyze Chinese production and potential with much precision have been confounded, EIA said.

Apart from name changes for some fields and radical differences in the way the sounds for Chinese characters have been transliterated to the western alphabet, it has been a common practice to lump statistics for more than one field.

EIA's 23.6 billion bbl reserve figure exceeded the estimates of other western sources. Those sources have estimated China's reserves at 17-20 billion bbl. EIA said that ignores the fact that reserve additions reported by the Chinese substantially exceeded the production they reported for the same period.

Reserve additions reported during 1975-85 included 2.7 billion bbl in new field discoveries and 11.5 billion bbl in extensions and revisions. Subtracting reported production in the same years of 7.6 billion bbl yields 6.6 billion bbl of reserve additions.

"Adding these reserve additions to the January 1976 reserves as reported in the literature yields 1986 reserves that are in line with EIA's 1986 estimate," EIA said.

Domestic demand will squeeze exports

China's soaring demand for petroleum products will squeeze its petroleum export volumes this century.

Even if China achieves its oil production and processing capacity targets, its crude and petroleum products exports could decline by more than half by 1995, Kim Woodard, president of China Energy Ventures Inc., Washington, D.C., told a November 1987 seminar in London.

As China's petroleum export focus narrows, it could halt shipments to the U.S., Woodard said at the seminar sponsored by Oil Daily and International Herald-Tribune.

China's surpassing Indonesia as Asia's largest oil export

China's petroleum exports and trade balance*

	1982	1983	1984	1985	1986	1987	1988	1989	1990	Growth rate 1985-90 (%)
PETROLEUM EXPORT VOLUME (1,000 b/d)										
Crude	293.6	296.6	440.2	600.0	570.0	544.0	552.0	557.0	560.0	−1.4
Daqing	—	—	396.2	480.0	427.5	374.0	345.0	313.3	280.0	−10.8
Shengli	—	—	44.0	120.0	142.5	170.0	207.0	243.7	280.0	+16.9
Products	107.6	107.6	124.9	136.1	109.2	111.0	99.0	83.0	68.0	−13.9
Total	**401.2**	**404.2**	**565.1**	**736.1**	**679.2**	**655.0**	**651.0**	**640.0**	**628.0**	**−3.2**
AVERAGE PRICE ($/bbl)										
Crude	30.30	26.72	25.08	23.97	11.43	16.38	18.25	20.13	21.00	
Daqing	—	—	—	—	12.00	17.00	19.00	21.00	22.00	
Shengli	—	—	—	—	11.00	15.00	17.00	19.00	20.00	
Products	35.42	33.53	29.68	29.15	18.86	22.00	25.00	26.00	27.00	
PETROLEUM EXPORT VALUE (billion $)†										
Crude	3.25	2.89	4.03	5.25	2.38	3.25	3.68	4.09	4.29	−4.0
Products	1.39	1.32	1.35	1.45	0.75	0.89	0.90	0.79	0.67	−15.4
Total	**4.64**	**4.21**	**5.38**	**6.70**	**3.13**	**4.14**	**4.58**	**4.88**	**4.96**	**−6.0**
FOREIGN TRADE (billion $)†										
Nonoil exports§	17.30	17.95	19.65	20.66	27.80	30.58	33.64	37.00	40.70	+13.6
Total exports§	21.94	22.16	25.03	27.36	30.93	34.72	38.22	41.88	45.66	+10.2
Imports¶	18.94	21.32	26.75	42.26	42.90	44.19	45.51	46.88	48.28	+2.7
Net balance	+3.00	+0.84	−1.72	−14.90	−11.97	−9.47	−7.29	−5.00	−2.62	

*Base case. †Current dollars. §fob. ¶cif.

Source: China Energy Ventures Inc. from data supplied by General Administration for Customs of the International Monetary Fund, People's Republic of China State Statistical Bureau, and the National Council for U.S.-China Trade

more than 36 billion bbl of original oil in place have been found in the Songliao basin since the first discoveries in 1958. Ultimate recovery from the fields is expected to be 12.9 billion bbl under January 1986 operating practices. Cumulative production through 1985 was 5.6 billion bbl.

Daqing field began producing in 1960. The field complex covers 385 sq miles with multiple reservoirs producing high wax crudes.

Secondary recovery is known to be in use in at least 10 major Chinese fields or field complexes.

Waterflooding is dominant, but other methods are being tried. The tests include polymer and CO_2 pilots in Daqing field, a polymer pilot in Dagang field, and single well polymer treatments in Renqiu field.

Cyclic steam injection is reported as successful in Liaohe and Shengli producing areas in reservoirs 3,000-5,000 ft deep, and steam drive is planned after several steam cycles.

Steam injection also has been under way in Karamay field since 1985.

EIA's figures indicated a recovery efficiency of 27.7% in the eastern region, 20.7% in the central region, and 33% in the west, for an overall average of 26.8%.

By another measure, lowering the reserves to production ratio to a "seemingly achievable" 20:1 from the present 26:1 would enable China to maintain its current 2.5 million b/d rate of production through 2049.

"This, in fact, is quite a reasonable scenario," EIA said.

Shengli field vies with Daqing

Shengli field provided a large share of China's oil production gains.

New field and new reservoir discoveries have been so successful in the Shengli complex in recent years that the field's production is expected to match No. 1 Daqing field's production by 1990, said China Features.

Production from Shengli in 1986 averaged 590,160 b/d. The increase of 49,600 b/d from 1985 accounted for 43.5% of China's total production rise. Pipelines move the crude to Qingdao on the Yellow Sea, to the nearby Xindian refinery, and 497 miles to the Nanjing refinery. Shengli crude is exported to Brazil, Philippines, Romania, Thailand, and the U.S.

The outlook is for Shengli to produce 800,000 b/d in 1989 and 1 million b/d in 1990, China Features reported in 1987.

The field covers 10,039 sq miles on China's east coast near the mouth of the Yellow River on the Bohai Sea.

In 1981 more than 100 geologists gathered in Shengli to discuss the field's future. Geologist Liu Xincai, the field's deputy chief, urged that exploration continue after production had been established.

Called "rolling exploration" by Chinese geologists, the technique was successful. For example, in the 193 sq mile Dongying Bulge area, production increased steadily from 66,000 b/d in 1983 to 92,000 b/d in 1985 and 118,000 b/d in 1986.

The Dongying experience served as an example in boosting reserves and increasing production in more than 30 oil fields with similar conditions in eastern China. Using rolling exploration, four oil fields with reserves of as much as 3.65 million bbl were found in the early 1980s in the northeastern part of the Shengli complex, where only thin oil bearing strata had been found about 10 years earlier.

China opened large new production in 1986 with start-up of Guodong field in Shengli's eastern lowlands. The area, a shallow sea only 10 years previously, was made suitable for land rigs by construction of a 6½ mile long dike and three drainage stations.

Large oil reserves were discovered in the area in 1984. About 1,000 wells had been drilled by the end of 1986, when

Outlook for North Sea rig supply/demand

	1987	1988	1989	1990	1991	1992
	Rig-years					
SEMISUBMERSIBLES						
Demand						
Production	3	3	4	5	5	5
Accommodation	4	3	4	3	2	2
Development	5	5	6	5	5	5
Exploration/ appraisal	25	33	34	38	39	39
Total	**37**	**44**	**48**	**51**	**51**	**51**
Supply*						
Rigs available†	69	67	65	64	63	62
Percent utilization	54	66	74	80	81	82
JACK UPS						
Demand						
Accommodation	1	1	1	1	1	1
Development	11	12	12	12	11	11
Exploration/ appraisal	18	20	21	22	23	23
Total	**30**	**33**	**34**	**35**	**35**	**35**
Supply*						
Rigs available†	50	48	47	46	46	45
Percent utilization	60	69	72	76	76	78

*Assumes an average of 1 rig-year for units in dock for upgrading/ maintenance. †Includes cold stacked rigs.

Source: Wood Mackenzie & Co. Ltd.

the structure.

Attaching a steel shield around the vulnerable sections of the circular tank would provide adequate protection, but installation would involve interrupting production from the field.

The double walled concrete structure could be built in two semicircular, 344 ft high sections that could be installed around the tank without interrupting production.

There would be a 29½ ft gap between the outer wall of the tank and the inner wall of the new protective structure. Phillips believes the 98.4 ft clearance between sea level and top of the wall will provide adequate protection for the tank. Timely approvals of the project could see Phillips free to seek bids in the spring of 1988. Work would begin later in 1988, and the wall would be installed during the 1989 weather window.

Veslefrikk orders

Statoil will develop Veslefrikk field with a floating production unit linked to a drilling platform. Aker Verdal received a $46 million contract to build the platform's jacket. It is scheduled for delivery in spring 1989.

Moss Rosenburg Verft of Stavanger will construct the wellhead deck unit and convert the West Vision semisubmersible drilling rig into a production unit. The work is worth $185 million.

The floater is scheduled for delivery in summer 1989. Production is to start in fall 1989, building to a peak of 65,000 b/d.

Oil, gas strikes in the North Sea

A revival in North Sea drilling was paying off with a series of encouraging oil and gas strikes, particularly off the U.K.

Heading the list of significant discoveries garnered from this drilling recovery was Kerr-McGee Oil (U.K.) plc's big Eocene oil strike off Britain.

Other significant discoveries cropped up in the central part of the U.K. North Sea, where competing plans for gas gathering pipelines emerged. More gas also has been discovered in the southern basin in the U.K. and Dutch sectors.

Appraisal of gas/condensate fields in the central part of the U.K. North Sea also has boosted drilling. British operators want a gas gathering system in this area that would enable reserves to be developed, ending the possibility of new imports from the Norwegian sector.

British Gas plc has said it will not accept reserve estimates from fields that are not fully appraised. Companies are also looking at a spate of new prospects in the southern basin that could make a significant contribution to meeting U.K. gas requirements during the 1990s.

British explorationists regarded Kerr-McGee's Eocene discovery in Block 9/18b as one of the most exciting finds off the U.K. in recent years.

It lies south of Mobil North Sea's Beryl field. The well flowed 6,844 b/d of 22° gravity oil through a 1¼ in. choke from Eocene pay. A second test of a higher perforated interval flowed 8.7 MMcfd of gas through a ⅜ in. choke, also from Eocene sands.

Testing of the oil interval was restricted by technical problems. Industry sources say flow rates of 15,000 b/d should have been possible. Kerr-McGee was to have spudded an appraisal before year-end 1987.

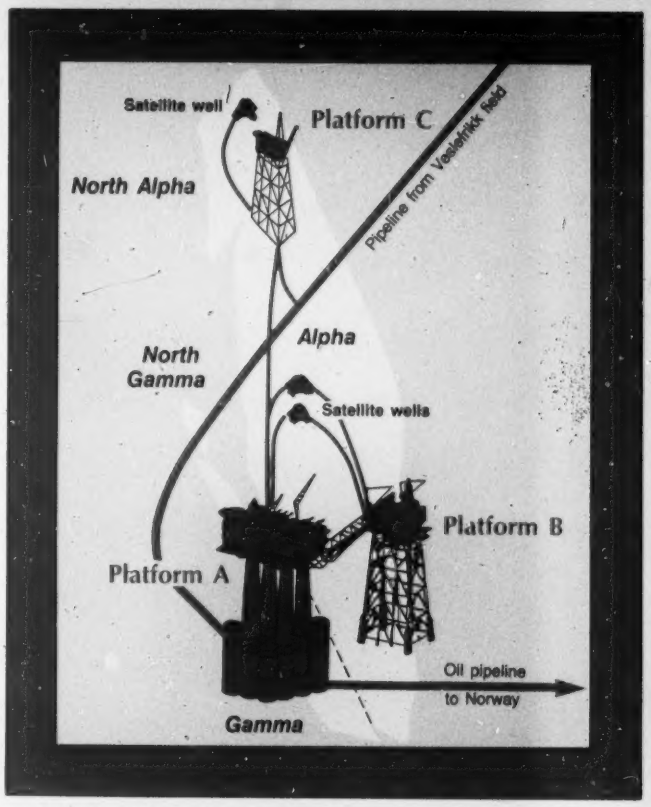
Some explorationists say the Eocene play appears to extend into adjoining Block 9/23b, where Britoil plc drilled a similar 22° gravity oil discovery.

Until the Kerr-McGee well results were disclosed, the most exciting exploration play off the U.K. was the Alba trend in Blocks 16/26 and 22/2.

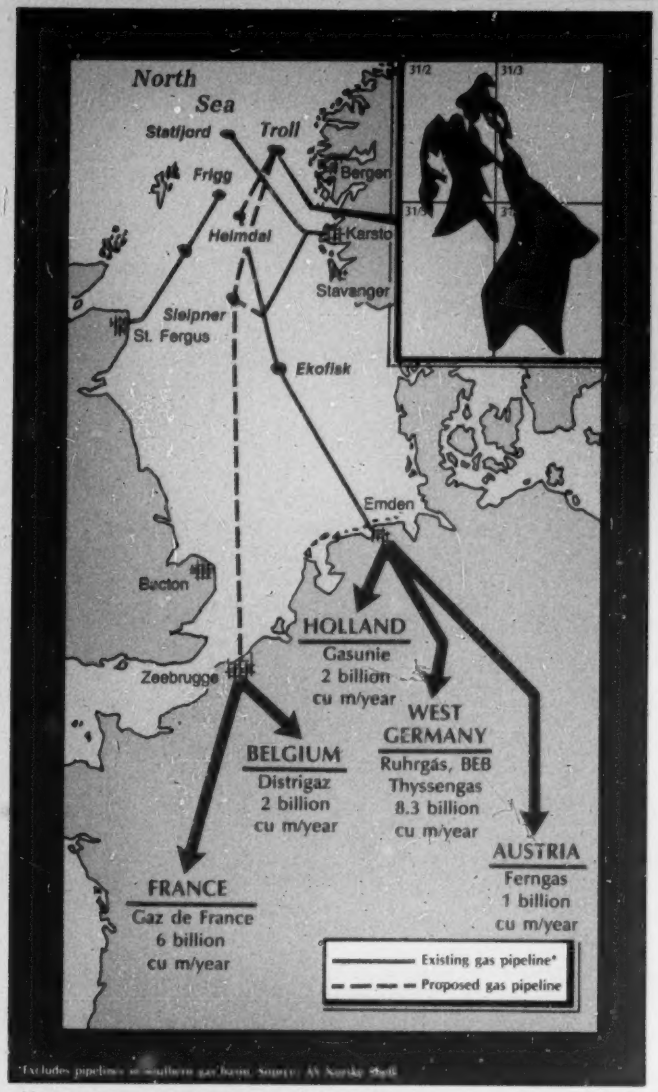
Chevron U.K. Ltd. was drilling the 16/26-9 appraisal of an Eocene discovery in an area where most of the oil comes from the Jurassic.

The Alba trend runs northwest-southeast from Chevron's

Norsk Hydro plans for Oseberg field

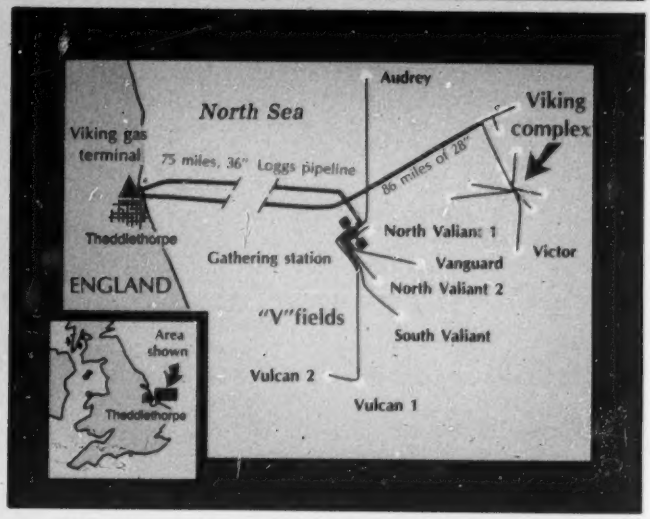


Where Troll field gas will be sold



*Excludes pipelines in southern gas basin. Source: A/S Norsk Shell

Pipelines and platforms in "V" fields



tested a potentially important oil strike near Frigg field. Elf's 25/5-1 well flowed 4,840 b/d of oil and 5.4 MMcfd of gas from the Jurassic, which had not previously yielded significant results in this area.

Gas and condensate in the area comes from Eocene or Paleocene. Elf has run new seismic in the vicinity of Frigg and has undertaken considerable geological remapping.

First indications that the Jurassic might be productive came when Elf found a thin Jurassic oil layer in Block 25/2b.

Norwegian sources say the 25/5-1 structure could contain as much as 200 million bbl of oil. A sidetrack of the 25/5-1 hole failed to find the oil/water contact.

Statoil found oil in the Egersund subbasin almost midway between Ekofisk field complex and the mainland. The company returned to test a separate structure on the block but drilled a dry hole. Statoil has tested a number of successful appraisals off Norway.

The 33/9-12 well led to an upgrading of reserves in East Statfjord field to 130 million bbl from 120 million bbl.

The 34/10-32 appraisal of the Gullfaks Alpha structure is likely to result in an upgrading of reserves. The well flowed 16,000 b/d of 22° gravity oil. Before the well test Statoil estimated reserves at 300 million bbl of oil and 3 tcf of gas.

In Dutch waters, Ultramar (Exploration) Netherlands tested a high flowing wildcat in Block J/6, adjacent to the U.K. boundary. Ultramar earlier found gas on the U.K. side of the line.

The company's J/6-1 wildcat flowed 60.7 MMcfd of gas and 282 b/d of condensate through a $^{73}/_{64}$ in. choke. It was drilled to 12,493 ft.

Relatively little drilling has been done in this area because the Rotliegendes formation, the most prolific producing zone in the southern basin, thins, reducing prospectivity.

The area is equidistant from U.K. and Dutch production and transportation systems. The most logical development option would be a single project covering U.K. and Dutch reserves. That could, for the first time, present a British group with the possibility of exporting gas.

The Ultramar well was almost the only well result announced off Netherlands in 1987, even though exploration and appraisal drilling has continued at a modest level. Most wells have been completed as tight holes.

Placid International Oil Ltd. and partners planned to start gas production from Dutch North Sea Block K/12-B.

The Heerema barge Hermod set a world heavy lift record when it set the 6,380 short ton topsides and processing unit on a jacket launched earlier. Previous record was a 5,400 metric ton lift at the U.K. North Sea Esmond, Forbes, and Gordon gas development in 1985.

A fifth well was being drilled, and production to be sold to Netherlands Gasunie was expected to build to a rate of more than 125 MMcfd.

The pickup in Danish exploration drilling has led to the start of two key wells.

Danish Undergrunds Consortium returned to the Gert structure after Norsk Hydro drilled a successful well on the Norwegian side of the line. Norsk Hydro's 2/12-1 well has reserves of 100-200 million bbl in a structure extending into the Danish North Sea.

After Norsk Hydro's success DUC reentered its Gert 1 well, plugged in 1984 after finding oil shows. The reentry flowed 4,000 b/d. DUC then spudded 3 Gert, which was expected to give a good indication of likely reserves for the entire structure. Drilling was approaching the reservoir depth.

Drilling late in the summer of 1987 began to show results from the government's decision to speed relinquishment of DUC's exclusive concession covering all acreage off Denmark.

In addition to DUC operations, units of Amoco, Phillips

Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
1	1	Exxon Corp.	69,484,000	1	76,555,000	1	5,360,000	1	32,012,000	1	7,200,000
2	2	Mobil Corp.	39,412,000	2	49,865,000	2	1,407,000	3	15,239,000	3	3,046,000
3	4	Texaco Inc.[1]	34,940,000	3	32,591,000	5	725,000	5	13,739,000	6	2,369,000
4	3	Chevron Corp.	34,583,000	4	27,131,000	6	715,000	2	15,493,000	4	3,018,000
5	5	Shell Oil Co.	26,214,000	6	17,353,000	3	883,000	4	14,312,000	5	2,842,000
6	6	Amoco Corp.	23,706,000	5	20,231,000	4	747,000	6	11,324,000	2	3,181,000
7	8	ARCO (Atlantic Richfield Corp.)	21,604,000	8	15,774,000	7	615,000	9	5,259,000	7	1,822,000
8	7	Tenneco Inc.	18,021,000	9	14,617,000	351	(39,000)	10	4,412,000	10	1,188,000
9	12	Occidental Petroleum Corp.	17,466,777	7	16,028,519	13	181,064	11	4,308,341	13	979,354
10	9	Standard Oil Co.[2]	15,955,000	12	10,115,000	394	(345,000)	7	7,020,000	8	1,618,000
11	10	Phillips Petroleum Co.	12,399,000	13	10,015,000	10	228,000	13	1,724,000	17	655,000
12	14	USX Corp. (Oil & Gas Segment)[3]	11,977,000	14	8,963,000	32	[4]42,000	—	NA	12	1,022,000
13	11	Sun Co.	11,684,000	11	10,440,000	8	385,000	8	5,287,000	11	1,087,000
14	13	Unocal Corp.	10,133,000	15	8,253,000	15	176,000	14	1,681,000	14	862,000
15	15	Conoco Inc.[5]	9,073,000	10	11,039,000	9	[6]355,000	—	NA	9	1,410,000
16	16	Enron Corp.	8,489,632	16	7,561,967	24	57,663	23	1,208,652	28	231,673
17	17	Coastal Corp.	7,777,300	18	6,718,100	20	71,600	28	788,900	25	234,200
18	19	Columbia Gas System Inc.	5,590,161	22	3,389,354	18	86,847	16	1,498,644	27	232,283
19	21	Texas Eastern Corp.	5,249,175	19	4,103,243	79	1,267	22	1,241,988	18	543,315
20	18	Amerada Hess Corp.	4,914,054	20	4,062,255	386	(219,443)	12	2,050,482	19	365,936
21	25	Transco Energy Co.	4,257,436	21	3,706,126	272	(4,307)	34	630,656	36	163,345
22	29	Consolidated Natural Gas Co.	3,825,601	24	2,627,780	16	174,693	15	1,582,943	23	274,400
23	27	Ashland Oil Inc.[8]	3,804,749	17	7,373,898	11	208,571	26	971,044	21	314,167
24	23	Diamond Shamrock Corp.[9]	3,517,400	26	2,543,500	373	(115,600)	17	1,395,800	48	106,200
25	33	Pennzoil Co.	3,369,278	29	1,921,223	29	45,443	32	695,339	26	233,009
26	31	Sonat Inc.	3,288,484	32	1,792,632	391	(304,300)	24	975,546	35	168,129
27	32	Enserch Corp.	3,233,558	23	2,722,821	39	26,878	25	973,393	29	226,228
28	30	Kerr-McGee Corp.	3,090,000	25	2,569,000	390	(292,000)	19	1,338,000	20	315,000
29	42	Mesa Limited Partnership	2,620,608	57	359,638	22	70,605	20	1,303,438	99	23,278
30	36	Meridian Oil Inc.[10]	2,370,974	47	740,566	397	(658,968)	18	1,375,830	55	96,031
31	38	Freeport-McMoRan Inc.	2,358,540	53	629,668	40	25,695	36	610,744	15	763,351
32	45	Arkla Inc.	2,284,663	41	1,002,244	23	64,179	35	616,368	39	148,900
33	37	Mitchell Energy & Development Co.[11]	2,060,688	52	632,051	52	8,430	42	569,144	44	122,953
34	39	Nicor Inc.	2,025,010	31	1,806,921	12	183,146	43	535,542	41	138,377
35	35	Murphy Oil Corp.	1,980,315	36	1,369,817	383	(194,750)	30	776,686	37	160,845
36	41	Union Texas Petroleum Holdings Inc.	1,949,610	38	1,235,181	363	(57,488)	375	(382,094)	24	272,761
37	34	Union Pacific Resources Co.[12]	1,883,000	27	2,520,000	396	(521,000)	52	371,000	31	198,000
38	44	Montana Power Co.	1,835,933	50	655,419	19	86,474	29	782,234	51	103,941
39	43	American Petrofina Inc.	1,776,969	28	2,020,903	339	(24,569)	33	654,106	42	134,064
40	55	Celeron Corp.[14]	1,755,300	112	63,200	385	(212,200)	—	NA	16	737,100
41	40	Valero Energy Corp.	1,697,322	30	1,880,125	370	(99,888)	51	377,425	77	41,751
42	52	Louisiana Land & Exploration Co.	1,680,200	44	826,500	333	(20,600)	37	604,100	30	219,500
43	—	Union Exploration Partners Ltd.[15]	1,632,700	51	635,500	14	176,400	21	[16]1,276,600	32	187,200
44	86	BHP Petroleum (Americas) Inc.[17,18]	1,539,932	82	171,581	51	9,119	62	273,968	47	108,900
45	47	Cabot Corp.[8]	1,509,744	37	1,320,106	21	71,051	38	591,130	59	88,629
46	50	Primark Corp.	1,491,285	34	1,562,878	26	53,797	44	473,949	56	89,035
47	48	Global Marine Inc.[1]	1,450,100	76	185,500	384	(209,200)	100	81,700	135	7,500
48	—	Anadarko Petroleum Corp.	1,376,301	72	209,254	49	10,091	46	431,809	43	123,704
49	49	Transco Exploration Partners Ltd.[19]	1,209,079	64	258,914	393	(336,949)	31	[16]731,620	45	122,652
50	65	National Fuel Gas Co.[8]	1,011,267	43	909,799	30	43,407	55	337,209	53	97,108
51	51	Ocean Drilling & Exploration Co.	1,007,830	56	364,443	389	(262,747)	39	578,975	68	63,731

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
174	0.176	262	0.232	128	3.292	236	4.677	169	0.176	259	0.232	121	3.292	234	4.677	232	1.00
79	1.308	—	—	71	11.80	—	—	72	1.308	—	—	62	11.80	—	—	168	3.00
193	0.130	—	—	64	13.85	293	1.707	190	0.130	—	—	55	13.85	290	1.707	154	3.63
207	[94]0.099	190	[94]1.282	243	0.403	171	18.06	203	[94]0.099	184	[94]1.282	241	0.403	166	18.06	298	[94]0.13
133	0.398	181	1.470	129	3.099	187	13.19	131	0.398	177	1.470	122	3.099	183	13.19	181	2.29
204	0.101	234	0.456	297	0.154	298	1.489	201	0.101	230	0.456	295	0.154	295	1.489	125	5.50
152	0.247	178	1.540	146	2.444	174	17.04	149	0.247	174	1.540	139	2.444	170	17.04	173	2.90
—	NA	251	0.312	—	NA	310	1.099	—	NA	248	0.312	—	NA	308	1.099	233	1.00
202	0.106	189	1.292	230	0.483	210	8.295	199	0.106	183	1.292	228	0.483	207	8.295	213	1.35
235	0.072	188	1.296	155	1.781	195	10.53	232	0.072	182	1.296	150	1.781	192	10.53	81	14.44
242	0.064	179	1.503	267	0.251	193	11.13	239	0.064	175	1.503	265	0.251	190	11.13	116	6.30
197	0.113	183	1.394	181	1.138	133	42.39	197	0.107	219	0.589	189	0.970	260	2.925	243	0.86
285	0.029	204	0.965	235	0.436	184	14.58	282	0.029	199	0.965	233	0.436	180	14.58	149	3.84
179	0.157	166	1.984	232	[30]0.446	192	[30]11.71	176	0.157	164	1.984	230	[30]0.446	189	[30]11.71	—	NA
227	0.079	226	0.504	162	1.584	219	6.950	223	0.079	223	0.504	157	1.584	216	6.950	—	—
312	0.017	239	0.411	302	0.142	248	3.513	309	0.017	236	0.411	300	0.142	246	3.513	105	8.50
99	0.835	119	5.388	97	6.465	132	42.44	94	0.835	113	5.388	90	6.465	126	42.44	—	NA
258	0.048	294	0.123	238	0.425	287	1.903	255	0.048	291	0.123	236	0.425	285	1.903	234	1.00
221	0.090	210	0.856	260	0.284	252	3.319	217	0.090	205	0.856	258	0.284	250	3.319	205	1.61
175	0.170	172	1.619	140	2.716	130	43.31	170	0.170	168	1.619	133	2.716	123	43.31	136	4.98
219	0.090	229	0.487	237	0.425	203	9.596	215	0.090	226	0.487	235	0.425	199	9.596	209	1.52
183	0.148	197	1.161	222	0.601	189	12.21	180	0.148	191	1.161	220	0.601	186	12.21	255	0.65
164	0.211	192	1.266	210	0.688	227	5.548	160	0.211	186	1.266	208	0.688	225	5.548	200	1.80
171	0.189	221	0.610	161	1.627	233	5.254	167	0.189	217	0.610	156	1.627	231	5.254	292	0.20
297	0.025	209	0.867	314	0.120	194	10.96	294	0.025	204	0.867	312	0.120	191	10.96	124	5.55
189	0.136	186	1.335	190	1.022	197	10.32	189	0.132	198	0.978	188	0.994	206	8.544	101	9.39
205	0.099	182	1.452	189	1.047	181	15.32	314	0.016	215	0.677	325	0.087	212	7.647	296	0.16
149	0.253	357	0.028	142	2.664	382	0.002	146	0.253	355	0.028	135	2.664	382	0.002	189	2.00
218	0.090	213	0.763	228	0.495	204	9.357	214	0.090	209	0.763	226	0.495	200	9.357	130	5.10
215	0.092	217	0.717	264	0.260	231	5.394	211	0.092	213	0.717	262	0.260	229	5.394	147	3.87
156	0.235	200	1.074	180	1.146	206	8.954	154	0.235	195	1.074	178	1.146	202	8.954	156	3.49
241	0.064	286	0.138	149	2.084	224	6.089	238	0.064	283	0.138	143	2.084	221	6.089	247	0.83
237	0.065	263	0.230	152	1.879	230	5.436	234	0.065	260	0.230	147	1.879	228	5.436	250	0.76
203	0.103	235	0.453	188	1.055	223	6.138	200	0.103	231	0.453	185	1.055	220	6.138	197	1.92
217	0.090	175	1.579	221	0.607	185	14.47	213	0.090	171	1.579	219	0.607	181	14.47	305	0.08
280	[103]0.033	320	[103]0.086	164	1.543	169	20.39	277	[103]0.033	318	[103]0.086	159	1.543	164	20.39	—	—
306	0.020	269	0.198	315	0.115	308	1.132	303	0.020	266	0.198	313	0.115	306	1.132	180	2.36
185	0.143	199	1.125	176	1.284	198	10.21	182	0.143	193	1.125	173	1.284	194	10.21	300	0.12
178	0.160	230	0.481	255	0.299	240	4.041	174	0.160	227	0.481	253	0.299	238	4.041	—	—
328	0.014	245	0.347	334	0.075	229	5.529	326	0.014	242	0.347	333	0.075	227	5.529	314	0.02
—	—	105	6.801	—	—	80	139.7	—	—	98	6.801	—	—	70	139.7	—	—
243	0.062	240	0.394	239	0.416	242	3.898	240	0.062	237	0.394	237	0.416	240	3.898	285	0.32
261	0.047	232	0.459	225	0.529	217	7.148	258	0.047	232	0.446	224	0.526	224	5.918	312	0.03
176	0.169	151	2.796	194	0.930	179	15.69	171	0.169	150	2.796	191	0.930	175	15.69	248	0.81
331	0.013	295	0.123	286	0.178	318	0.840	329	0.013	292	0.123	284	0.178	316	0.840	270	0.48
201	0.106	272	0.184	154	1.831	261	2.963	198	0.106	269	0.184	149	1.831	258	2.963	187	2.12
191	0.134	196	1.174	276	0.202	215	7.635	187	0.134	190	1.174	274	0.202	213	7.635	135	5.00
208	0.098	354	0.033	115	4.209	360	0.160	204	0.098	352	0.033	109	4.209	359	0.160	129	5.25
327	0.014	384	0.001	327	0.083	—	—	325	0.014	383	0.001	326	0.083	—	—	—	—
77	1.360	127	4.338	59	18.51	121	52.88	70	1.360	124	4.338	47	18.51	114	52.88	—	NA
226	0.081	238	0.415	219	0.654	265	2.839	222	0.081	235	0.415	217	0.654	263	2.839	195	1.95

Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
52	60	Questar Corp.	968,160	54	528,304	31	43,164	48	413,798	65	70,660
53	—	Ensearch Exploration Partners Ltd.[20]	964,586	68	228,034	27	53,073	27	[16]797,116	40	139,195
54	70	Equitable Resources Inc.	939,695	55	457,217	25	54,118	47	414,503	52	103,803
55	53	Grace Natural Resources Group[21]	[22]939,000	58	338,000	—	NA	—	NA	101	21,000
56	58	Oneok Inc.[23]	936,363	48	736,776	34	34,460	54	341,288	57	88,935
57	61	Total Petroleum (North America) Ltd.	920,212	33	1,597,353	33	37,955	53	343,682	34	171,813
58	64	Rowan Cos. Inc.	919,096	83	167,163	353	(42,147)	40	578,925	49	104,400
59	56	Zapata Corp.[9]	875,431	69	225,219	388	(250,928)	77	144,530	84	33,459
60	57	Santa Fe Energy Co.[25]	867,000	65	256,900	380	[26](154,500)	—	NA	38	159,500
61	62	Hamilton Oil Corp.	863,821	62	273,986	48	11,007	59	294,729	85	32,950
62	—	Freeport-McMoRan Energy Partners Ltd.[27]	842,847	88	141,291	392	(306,520)	41	[16]576,871	58	88,637
63	69	Reading & Bates Corp.	793,516	86	158,281	379	(145,805)	85	122,193	46	121,887
64	72	Diversified Energies Inc.	759,652	46	760,371	323	(14,858)	65	256,864	70	56,033
65	90	Apache Corp.	728,855	81	171,656	309	(10,873)	68	207,379	33	183,020
66	73	Unimar Co.[28]	699,550	78	182,451	340	(24,602)	60	288,818	80	36,974
67	78	Yankee Cos.[29]	699,346	60	326,842	67	2,970	122	32,599	166	4,417
68	66	Apache Petroleum Co. L.P.[31]	686,575	75	190,965	381	(182,761)	56	[16]320,275	22	297,180
69	76	CENEX (Farmers Union Central Exchange Inc.)[8]	665,242	39	1,093,181	314	[32](12,061)	61	[33]283,246	102	19,000
70	79	Quaker State Corp.	665,042	42	917,135	28	50,288	50	330,661	64	74,273
71	89	Noble Affiliates Inc.	590,179	91	129,285	366	(64,258)	66	215,992	60	87,038
72	74	Pogo Producing Co.	582,330	87	151,071	365	(58,296)	363	(13,133)	69	63,339
73	67	Tesoro Petroleum Corp.[8]	566,868	35	1,478,600	377	(124,842)	69	197,543	82	35,443
74	84	Helmerich & Payne Inc.[8]	563,236	85	160,368	55	7,025	49	408,185	67	64,767
75	120	Moore McCormack Energy Inc.[34]	551,159	59	334,148	374	(116,485)	64	263,190	76	44,173
76	81	Tidewater Inc.[35]	530,084	66	244,743	328	(18,645)	63	272,366	74	47,994
77	80	Tosco Corp.	491,889	45	790,717	43	17,580	76	150,253	105	15,121
78	91	Forest Oil Corp.	471,047	102	89,275	263	(3,702)	101	78,800	75	44,356
79	95	CSX Oil & Gas Corp.[36]	460,161	71	214,969	71	1,934	67	215,010	62	82,624
80	85	Sunshine Mining Co.	458,644	90	133,952	371	(103,250)	84	122,641	108	14,150
81	87	Adobe Resources Corp.	455,609	95	112,010	357	(43,722)	57	301,795	88	32,003
82	88	Southern Union Co.	455,123	73	199,829	78	1,282	80	130,884	87	32,383
83	75	Kaneb Services Inc.	453,542	94	113,655	382	(184,224)	81	129,791	94	28,825
84	—	Diamond Shamrock Offshore Parners L.P.[39]	451,382	97	106,538	361	(54,594)	45	[16]443,857	93	29,261
85	101	Primary Fuels Inc.[40]	430,668	99	105,376	—	NA	—	NA	92	29,400
86	94	Crown Central Petroleum Corp.	427,764	40	1,057,795	332	(20,231)	74	168,774	73	[41]49,200
87	59	American Royalty Trust[20]	425,523	74	192,110	17	97,783	72	193,394	—	NA
88	—	Santa Fe Energy Partners L.P.[42]	399,200	96	110,100	378	(125,900)	58	296,000	50	104,300
89	63	FPCO Oil & Gas Co.[20,43]	397,612	80	176,106	395	(415,570)	374	(251,664)	95	26,393
90	—	Pacific Lighting Oil & Gas Co.[44]	387,424	92	122,564	372	[45](107,677)	70	196,290	54	96,373
91	97	First Mississippi Corp.[29]	304,111	63	272,789	344	(28,110)	78	142,070	89	31,635
92	98	National Cooperative Refinery Association[29]	298,982	49	730,468	355	[46](42,686)	86	[47]120,869	90	30,104
93	103	Sabine Corp.	294,730	110	64,113	346	(35,453)	73	191,316	78	37,201
94	—	NRM Energy Co. L.P.[48]	277,956	116	53,822	338	(24,300)	75	[16]157,407	72	53,336
95	104	Seagull Energy Corp.	264,395	79	176,971	206	(1,326)	91	101,012	114	13,001
96	113	Triton Energy Corp.[35]	263,893	103	86,187	354	(42,387)	89	104,293	63	78,774
97	105	DeKalb Energy Cos.[23,49]	262,000	104	84,300	342	[50](27,400)	—	NA	71	53,500
98	109	Southwestern Energy Co.	260,349	105	78,892	46	15,422	99	81,879	103	18,354
99	107	NUI Corp.[8]	239,794	61	278,278	312	(11,895)	112	49,988	97	23,851
100	108	TGX Corp.[51]	236,774	146	24,585	92	721	93	95,849	171	4,031
101	99	Quinoco Cos.[52]	209,288	115	57,453	375	(121,365)	71	193,877	242	1,000
102	96	Home Petroleum Corp.[23,53]	201,798	118	52,474	298	(8,288)	—	NA	81	36,369

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
123	0.493	148	2.892	119	3.938	186	13.34	118	0.493	147	2.892	113	3.938	182	13.34	207	1.55
83	1.246	110	5.873	114	4.352	144	32.82	76	1.246	103	5.873	108	4.352	138	32.82	275	0.42
145	0.294	108	5.900	158	1.700	125	49.40	—	—	—	—	165	1.377	146	28.65	—	NA
125	0.468	113	5.645	139	2.780	140	36.23	121	0.468	106	5.645	132	2.780	134	36.23	164	3.10
263	0.046	159	2.537	229	0.491	120	53.53	260	0.046	157	2.537	227	0.491	112	53.53	160	3.26
126	0.464	154	2.678	133	2.924	173	17.06	122	0.464	152	2.678	128	2.924	169	17.06	79	14.76
158	0.222	168	1.948	143	2.636	146	32.10	175	0.157	180	1.337	160	1.539	177	15.14	165	3.10
212	0.094	170	1.853	248	0.357	183	15.06	208	0.094	167	1.853	246	0.357	179	15.06	48	35.32
155	0.237	211	0.827	117	4.195	126	45.52	153	0.237	206	0.827	111	4.195	120	45.52	184	2.18
173	0.188	89	10.12	195	0.926	99	86.57	172	0.168	125	4.197	206	0.712	167	17.61	286	0.30
224	0.081	176	1.568	209	0.697	142	35.22	220	0.081	172	1.568	207	0.697	136	35.22	76	17.03
168	0.199	147	2.905	208	0.730	152	28.21	164	0.199	146	2.905	205	0.730	147	28.21	218	1.29
290	0.027	214	0.750	281	0.193	228	5.546	287	0.027	210	0.750	279	0.193	226	5.546	271	0.47
129	0.431	95	7.907	178	1.267	154	27.80	126	0.431	88	7.907	176	1.267	149	27.80	252	0.75
232	0.076	157	2.593	211	0.684	94	103.2	229	0.076	155	2.593	209	0.684	86	103.2	98	10.40
194	0.128	243	0.351	204	0.798	281	2.090	191	0.128	240	0.351	200	0.798	279	2.090	145	3.91
238	0.065	224	0.526	224	0.552	188	12.51	235	0.065	221	0.526	222	0.552	185	12.51	—	NA
252	0.053	180	1.483	254	0.308	178	15.81	249	0.053	176	1.483	252	0.308	174	15.81	—	NA
134	0.394	161	2.114	172	1.309	170	20.03	132	0.394	159	2.114	169	1.309	165	20.03	174	2.84
118	0.560	171	1.828	66	12.79	116	60.40	112	0.560	194	1.124	57	12.79	119	48.77	—	—
132	0.402	133	3.767	179	1.213	161	23.53	130	0.402	131	3.767	177	1.213	157	23.53	196	1.93
172	0.189	124	4.775	166	1.461	141	35.71	168	0.189	120	4.775	162	1.461	135	35.71	303	0.10
216	0.090	164	2.005	175	1.285	159	24.16	212	0.090	162	2.005	172	1.285	155	2.16	144	3.97
225	0.081	152	2.787	216	0.660	145	32.39	221	0.081	151	2.787	214	0.660	139	32.39	236	0.95
146	0.275	149	2.853	168	1.401	176	16.91	142	0.275	148	2.853	164	1.401	172	16.91	277	0.40
169	0.193	123	4.818	207	0.777	153	28.14	165	0.193	119	4.818	204	0.777	148	28.14	70	21.00
264	0.046	131	3.927	277	0.202	156	25.54	261	0.046	129	3.927	275	0.202	152	25.54	193	1.97
345	0.009	280	0.157	360	0.025	316	0.910	343	0.009	277	0.157	359	0.025	314	0.910	—	—
165	0.205	167	1.958	213	0.669	191	11.72	161	0.205	165	1.958	211	0.669	188	11.72	172	2.90
311	0.018	165	2.000	271	0.237	135	41.00	308	0.018	163	2.000	269	0.237	128	41.00	77	17.00
151	0.249	138	3.595	198	0.874	167	20.71	148	0.249	136	3.595	194	0.874	162	20.71	264	0.57
127	0.456	174	1.586	124	3.599	157	24.80	123	0.456	170	1.586	116	3.599	153	24.80	231	1.00
135	0.391	163	2.028	135	2.868	166	21.74	133	0.391	161	2.028	130	2.868	161	21.74	204	1.69
240	0.065	—	—	287	0.177	—	—	237	0.065	—	—	285	0.177	—	—	—	—
196	0.123	193	1.219	193	0.955	175	16.95	193	0.123	187	1.219	190	0.955	171	16.95	—	NA
103	0.719	135	3.669	100	6.200	160	23.75	98	0.719	134	3.669	94	6.200	156	23.75	134	5.00
277	0.035	68	15.83	231	0.478	52	346.2	274	0.035	63	15.83	229	0.478	46	346.2	95	11.00
181	0.153	187	1.327	215	0.661	208	8.819	178	0.153	181	1.327	213	0.661	204	8.819	—	NA
85	1.167	145	3.036	147	2.236	190	12.12	78	1.167	143	3.036	140	2.236	187	12.12	199	1.80
305	0.020	184	1.383	282	0.187	211	8.129	302	0.020	178	1.383	280	0.187	208	8.129	—	—
159	0.221	177	1.545	218	0.655	202	9.650	156	0.221	173	1.545	216	0.655	198	9.650	208	1.54
182	0.149	139	3.469	203	0.825	158	24.56	179	0.149	137	3.469	199	0.825	154	24.56	161	3.19
184	0.144	—	—	332	0.075	—	—	181	0.144	—	—	331	0.075	—	—	—	—
188	0.136	223	0.539	118	3.943	149	29.91	185	0.136	220	0.539	112	3.943	142	29.91	142	4.00
251	[a]0.054	126	[a]4.589	236	0.433	112	68.80	248	[a]0.054	123	[a]4.589	234	0.433	103	68.80	214	[a]1.34
286	0.029	222	0.597	285	0.181	165	21.75	283	0.029	218	0.597	283	0.181	160	21.75	166	3.05
254	0.050	244	0.350	270	0.238	243	3.897	251	0.050	241	0.350	268	0.238	241	3.897	—	NA
114	0.569	169	1.875	112	4.707	177	16.01	108	0.569	166	1.875	106	4.707	173	16.01	291	0.20
106	0.659	191	1.279	94	6.826	234	5.172	100	0.659	185	1.279	87	6.826	232	5.172	188	2.00
239	0.065	208	0.877	262	0.272	220	6.942	236	0.065	203	0.877	260	0.272	217	6.942	140	4.41
260	0.048	225	0.512	261	0.282	205	9.204	257	0.048	222	0.512	259	0.282	201	9.204	223	1.14

Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
103	114	NOMECO (Northern Michigan Exploration[54]	200,993	107	71,298	194	(976)	83	126,946	86	32,888
104	133	Allegheny & Western Energy Corp.[29]	198,325	67	239,366	44	16,740	106	67,934	116	12,369
105	106	Texas International Co.[56]	195,699	111	63,717	360	(50,798)	373	(132,561)	133	7,951
106	112	Prairie Producing Co.[57]	195,697	145	24,782	362	[26](55,678)	371	(82,166)	98	23,517
107	—	Norcen Energy Resources Ltd.[58]	184,226	179	12,595	213	(1,479)	116	42,971	79	37,161
108	110	Pelto Oil Co.[59]	182,067	126	40,294	359	[50](45,742)	—	NA	91	29,462
109	100	Damson Oil Corp.[8]	175,884	121	49,410	368	(74,642)	174	9,366	127	9,498
110	111	Kaiser Energy Inc.[60]	175,586	149	22,601	347	(35,575)	95	92,918	115	12,971
111	146	Hadson Corp.[61]	162,602	70	216,823	57	4,908	118	40,717	107	14,834
112	127	Pyro Energy Corp.	159,061	98	105,474	58	4,775	104	71,890	143	6,764
113	117	Howell Corp.	158,103	101	93,938	331	(19,961)	110	53,813	138	7,147
114	118	Felmont Oil Corp.[62]	156,496	113	59,423	60	3,829	82	129,561	113	13,217
115	—	Ram Industries Inc.[35,63]	153,935	400	0	117	0	79	131,726	382	0
116	138	Park-Ohio Industries Inc.	152,899	89	138,561	294	(7,749)	97	84,067	162	4,895
117	183	Statex Petroleum Inc.[64]	140,274	178	13,086	222	[6](1,848)	—	NA	—	NA
118	—	Kaneb Energy Partners Ltd.[65]	133,070	123	[66]46,870	376	[66](121,402)	92	99,303	112	[66]13,222
119	—	Avalon Corp.	130,858	165	16,463	68	2,347	90	102,116	159	4,996
120	119	Kirby Exploration Co. Inc.	129,071	109	64,147	341	(26,417)	115	46,369	168	4,365
121	209	Harken Oil & Gas Inc.	125,222	239	4,379	108	196	125	30,979	150	5,915
122	125	Wainoco Oil Corp.	124,756	127	37,552	330	(19,953)	253	2,294	152	5,787
123	132	Texas American Energy Corp.	123,479	93	121,799	317	(13,727)	229	3,329	131	8,277
124	126	Cenergy Corp.	123,332	128	36,988	285	(6,478)	117	41,433	104	15,688
125	140	Snyder Oil Partners L.P.	122,381	138	27,531	352	(41,517)	87	108,653	66	66,828
126	131	Sage Energy Co.[29]	122,367	120	49,507	282	(5,912)	107	67,675	83	34,612
127	—	Wintershall Corp.[58]	118,393	152	22,133	—	NA	—	NA	61	84,003
128	—	Noble Drilling Corp.	115,627	130	35,837	358	(43,955)	105	70,924	163	4,810
129	149	Global Natural Resources Inc.	114,194	131	34,843	59	4,063	94	93,184	129	8,731
130	122	Ensource Inc.	113,860	129	36,806	261	(3,497)	134	24,474	124	9,631
131	142	Wiser Oil Co.	109,760	133	32,906	74	1,598	96	91,676	111	13,360
132	115	Universal Resources Corp.[67]	108,566	142	26,658	369	(85,419)	124	31,513	130	8,523
133	145	San Juan Basin Royalty Trust	107,181	154	21,148	42	20,681	88	[68]105,863	—	NA
134	134	Asamera Inc.[58]	103,936	77	183,402	321	(14,767)	—	NA	148	6,234
135	116	MCO Resources Inc.	102,594	135	31,396	350	(38,555)	211	5,020	175	3,880
136	102	Crystal Oil Co.[69]	101,927	119	51,373	387	(232,182)	162	12,722	158	5,056
137	129	Conquest Exploration Co.	98,011	163	17,302	06	(9,806)	103	74,531	10	13,830
138	128	Consolidated Oil & Gas Inc.[70]	97,033	157	19,830	35	(21,520)	65	(16,728)	01	2,297
139	—	Integrated Drilling & Exploration Inc.[71]	91,032	147	24,251	64	(3,752)	98	83,916	25	9,552
140	150	Unit Corp.[72]	90,807	143	26,413	00	(8,435)	113	49,703	09	14,044
141	173	American Exploration Co.	88,286	176	13,259	311	(11,462)	154	15,721	100	23,100
142	151	Flag-Redfern Oil Co.	86,238	141	27,085	105	213	108	65,353	120	9,908
143	141	Graham-McCormick Oil & Gas Partnership	82,053	151	22,367	343	(27,402)	202	[18]5,600	174	3,881
144	139	Chieftain Development Co. Ltd.[58]	82,049	169	14,919	137	[73](167)	—	NA	149	6,042
145	124	Tom Brown Inc.[35]	81,442	134	32,007	367	(72,951)	94	6,365	118	11,397
146	157	SPG Exploration Corp.[74]	79,697	148	24,105	277	[6](5,141)	—	NA	160	4,935
147	143	Freeport-McMoRan Oil & Gas Royalty Trust	78,554	139	27,245	47	12,708	102	[66]77,239	—	NA
148	—	Exploration Co. of Louisiana Inc.	74,663	198	8,753	101	314	111	52,198	123	9,770
149	152	May Petroleum Inc.	64,748	156	20,375	329	(19,322)	119	40,459	121	9,901
150	161	Pauley Petroleum Inc.[23]	64,589	84	164,991	56	5,004	130	27,775	134	7,705
151	137	Houston Oil Trust	61,064	160	18,678	45	15,801	109	[66]61,064	—	NA
152	181	Tribune/Swab-Fox Cos. Inc.	56,340	117	53,506	245	(2,745)	135	24,010	211	1,864
153	169	Equity Oil Co.	56,145	184	11,732	180	(789)	120	39,039	155	5,464

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
68	1.900	84	11.30	92	6.900	107	78.20	62	[55]1.718	79	[55]11.30	97	[55]5.800	102	[55]70.70	72	20.28
374	0.002	198	1.147	363	0.022	162	23.38	373	0.002	192	1.147	362	0.022	158	23.38	78	16.10
58	2.926	94	7.968	53	22.76	95	98.54	52	2.875	101	6.130	54	14.30	106	63.16	150	3.83
104	0.661	101	7.230	76	9.160	114	61.44	99	0.661	95	7.230	69	9.160	108	61.44	—	NA
120	0.523	125	4.596	116	4.200	92	105.0	116	0.523	122	4.596	110	4.200	84	105.0	65	22.40
100	0.801	75	13.73	93	6.857	86	111.7	96	0.801	69	13.73	86	6.857	78	111.7	91	12.50
109	0.647	106	6.367	144	[7]2.594	110	[7]73.90	102	0.647	99	6.367	136	[7]2.594	100	[7]73.90	109	8.10
147	0.270	116	5.514	167	1.447	96	96.90	143	0.270	108	5.514	163	1.447	87	96.90	111	8.00
131	0.426	109	5.900	156	1.731	137	36.87	128	0.426	102	5.900	151	1.731	131	36.87	94	12.00
170	0.190	173	1.609	169	1.365	172	17.16	166	9.190	169	1.609	166	1.365	168	17.16	185	2.16
94	0.896	128	4.308	89	7.237	104	82.08	88	0.890	128	3.981	85	7.053	105	64.93	153	3.64
98	0.851	78	12.57	131	3.033	111	72.66	93	0.851	73	12.57	124	3.033	101	72.66	53	29.40
—	—	—	—	104	5.402	47	463.9	—	—	—	—	99	5.402	41	463.9	—	—
187	0.141	142	3.315	153	1.847	123	51.01	184	0.141	140	3.315	148	1.847	117	51.01	132	5.00
166	0.204	137	3.623	150	1.938	105	80.95	162	0.204	135	3.623	144	1.938	96	80.95	—	NA
90	[68]0.974	76	[68]13.21	98	6.421	93	104.4	84	[66]0.974	70	[66]13.21	92	6.421	85	104.4	49	[66]35.00
161	0.217	153	2.706	137	2.816	91	105.1	224	0.079	378	0.005	201	0.795	375	0.064	276	0.40
119	0.544	146	2.914	132	2.983	163	22.95	114	0.544	145	2.914	126	2.983	159	22.95	186	2.15
213	0.092	303	0.110	173	1.304	212	8.108	209	0.092	301	0.110	170	1.304	209	8.108	—	NA
102	0.723	67	16.10	108	5.102	62	268.1	129	0.423	132	3.741	141	2.221	113	53.52	254	0.65
128	0.445	162	2.066	126	3.322	180	15.56	125	0.445	160	2.066	119	3.322	176	15.56	297	0.15
91	0.973	115	5.554	110	5.001	117	60.09	85	0.973	107	5.554	104	5.001	110	60.09	119	6.10
97	0.866	104	6.810	77	9.057	101	85.04	92	0.866	97	6.810	70	9.057	91	85.04	96	10.70
78	1.321	111	5.859	88	7.252	148	30.78	71	1.321	104	5.859	81	7.252	141	30.78	75	17.79
101	0.745	121	5.329	—	NA	—	NA	97	0.745	115	5.329	—	NA	—	NA	43	40.00
257	0.049	260	0.235	234	0.438	276	2.307	254	0.048	257	0.235	232	0.438	274	2.307	141	4.10
136	0.376	91	9.096	123	3.766	83	124.8	136	0.352	109	5.491	137	2.533	124	43.29	84	14.00
116	0.565	90	9.288	121	3.807	97	94.43	110	0.565	85	9.288	115	3.807	88	94.43	114	7.18
93	0.934	117	5.480	78	8.913	103	83.42	87	0.934	110	5.480	71	8.913	94	83.42	45	37.70
117	0.565	100	7.255	136	2.827	122	52.12	111	0.565	94	7.255	131	2.827	116	52.12	113	7.34
247	0.058	86	10.73	185	1.087	61	283.1	244	0.058	82	10.73	182	1.087	50	283.1	194	1.96
292	0.027	335	0.059	357	0.028	362	0.141	289	0.027	333	0.059	356	0.028	361	0.141	266	0.55
107	0.659	88	10.17	130	3.054	109	74.14	101	0.659	84	10.17	123	3.054	99	74.14	201	1.77
70	1.715	79	12.24	90	7.201	115	61.05	63	1.715	74	12.24	82	7.201	109	61.05	155	3.50
144	0.299	103	7.000	177	1.283	134	41.23	141	0.299	96	7.000	174	1.283	127	41.23	—	—
121	0.498	114	5.627	107	5.194	82	127.0	120	0.487	116	5.308	103	5.045	76	119.6	216	1.32
200	0.109	150	2.833	183	1.124	136	40.89	196	0.109	149	2.833	180	1.124	129	40.89	115	7.00
180	0.155	156	2.616	201	0.829	168	20.43	177	0.155	154	2.616	197	0.829	163	20.43	148	3.85
138	0.356	143	3.279	125	3.401	151	28.69	135	0.356	141	3.279	118	3.401	145	28.69	198	1.89
89	0.978	122	4.984	102	5.919	139	36.44	83	0.978	118	4.984	96	5.919	133	36.44	100	10.20
314	0.016	120	5.334	184	1.119	98	91.82	311	0.016	114	5.334	181	1.119	89	91.82	—	—
113	0.597	259	0.246	111	4.888	207	8.928	106	0.597	256	0.246	105	4.888	203	8.928	212	1.43
96	0.869	141	3.384	113	4.515	124	50.42	91	0.869	139	3.384	107	4.515	118	50.42	82	14.30
139	0.336	96	7.889	—	[24]NA	—	[24]NA	137	0.336	89	7.889	—	[24]NA	—	[24]NA	133	5.00
141	0.317	93	8.049	217	0.656	138	36.66	139	0.317	87	8.049	215	0.656	132	36.66	—	NA
160	0.220	155	2.633	157	1.710	113	63.06	157	0.220	153	2.633	152	1.710	107	63.06	182	2.24
162	0.214	99	7.279	223	0.598	143	33.87	158	0.214	93	7.279	221	0.598	137	33.87	151	3.80
76	1.405	219	0.660	73	10.69	239	4.330	69	1.405	216	0.660	67	10.69	237	4.330	146	3.90
122	[75]0.496	118	[75]5.456	163	[75]1.545	147	[75]31.26	117	[75]0.496	111	[75]5.456	158	[75]1.545	140	[75]31.26	225	1.10
248	0.058	218	0.700	296	0.155	253	3.224	245	0.058	214	0.700	294	0.155	251	3.224	282	0.34
108	0.650	202	1.004	87	7.322	129	43.36	115	0.539	208	0.770	102	5.250	130	38.49	220	1.22

Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
154	154	Callon Petroleum Co.	55,788	161	18,388	348	(37,156)	370	(40,104)	122	9,894
155	172	OKC Limited Partnership	55,200	114	58,787	38	27,673	114	[16]47,765	119	10,795
156	203	Ethyl Corp. (Energy Segment)[76]	54,288	124	46,499	61	[50]3,696	—	NA	132	7,987
157	153	Entex Energy Development Ltd.	53,373	159	19,277	349	(37,417)	136	[16]23,782	169	4,109
158	163	Alamco Inc.	52,948	172	14,237	296	(7,914)	187	7,277	212	1,782
159	170	Beard Co.	52,826	168	15,333	262	(3,606)	151	16,865	145	6,591
160	164	Wilshire Oil Co. of Texas	52,293	213	7,256	302	(8,950)	168	10,906	177	3,638
161	215	Leader Development Corp.[11,77]	52,152	122	47,876	77	1,325	144	19,181	151	5,914
162	167	Galaxy Oil Co.[1]	51,284	207	7,746	303	(8,961)	246	2,646	296	399
163	—	AMAX Inc. (Oil & Gas Operations)	50,000	132	34,000	50	[50]10,000	—	NA	207	[78]2,000
164	191	Presidio Oil Co.[29]	49,492	215	7,055	81	1,182	131	26,154	154	5,541
165	196	Plains Resources Inc.	48,913	194	9,724	185	(888)	153	16,107	126	9,524
166	174	DI Industries Inc.[35,79]	48,032	189	10,394	289	(6,757)	170	10,320	229	1,332
167	155	Pend Oreille Oil & Gas Co.[80]	47,788	144	24,817	65	[50]3,189	—	NA	308	300
168	185	Fuel Resources Development Co.[70,81]	43,174	208	7,688	161	(472)	140	21,050	180	3,261
169	171	Patrick Petroleum Co.	43,098	206	7,981	301	(8,812)	126	29,837	164	4,785
170	156	Thermal Exploration Co.[82]	42,223	252	3,470	279	(5,559)	353	(2,044)	106	15,118
171	182	Fuel Resources Inc.[83]	40,742	203	8,586	318	(13,823)	—	NA	146	6,418
172	179	Maynard Oil Co.	40,014	171	14,246	244	(2,710)	128	28,956	170	4,072
173	166	Argo Petroleum Corp.[1]	39,510	183	11,874	334	(20,968)	369	(36,060)	243	963
174	175	May Energy Partners Ltd.	38,006	170	14,681	292	(7,496)	139	22,259	188	2,951
175	162	Walker Energy Partners	37,962	167	15,358	345	(31,429)	160	[16]13,162	255	803
176	197	Alexander Energy Corp.[35]	37,131	210	7,606	113	73	152	16,459	176	3,664
177	193	Devon Resource Investors	36,976	202	8,617	184	(835)	129	[16]28,443	156	5,449
178	159	American Quasar Petroleum Co.	36,303	185	11,442	337	(24,126)	372	(87,122)	221	1,470
179	192	Bogert Oil Co.[8]	35,707	158	19,290	73	1,647	150	17,432	141	6,932
180	176	Samson Energy Co.	35,699	191	10,255	320	(14,144)	132	[16]25,358	147	6,412
181	—	American Oil & Gas Corp.	35,601	106	75,094	243	(2,661)	164	11,684	232	1,294
182	158	Chapman Energy Inc.	35,578	173	13,948	356	(43,408)	64	(15,021)	184	3,150
183	—	Penn Virginia Resources Corp.[84]	35,312	199	8,690	64	[50]3,268	—	NA	153	5,546
184	136	Oxoco Inc.	35,078	164	16,467	35	31,802	180	8,000	194	2,577
185	148	Tipperary Corp.[8]	34,722	140	27,197	364	(58,085)	368	(34,203)	182	3,218
186	165	ConVest Energy Partners Ltd.	34,491	177	13,208	336	(23,702)	142	[16]19,657	203	2,228
187	200	Calumet Industries Inc.[8]	34,458	125	43,306	75	1,457	156	15,236	193	2,634
188	297	Enex Resources Corp.[85]	33,930	222	5,457	140	(212)	123	31,738	96	25,329
189	184	Deminex U.S. Oil Co.	33,782	166	16,189	288	(6,745)	178	8,381	183	3,200
190	217	Plains Petroleum Co.	32,923	175	13,558	63	3,588	155	15,692	208	1,984
191	—	Nerco Oil & Gas Inc.[86]	32,900	235	4,500	307	(10,500)	127	29,800	144	6,600
192	177	LL&E Royalty Trust	32,747	136	30,384	36	29,371	121	[68]32,747	—	NA
193	188	Energy Ventures Inc.	32,564	231	4,743	85	871	143	19,564	349	77
194	187	Federated Natural Resources Corp.	31,923	192	9,992	281	(5,777)	205	5,330	173	3,908
195	180	Petroleum Investments Ltd.	31,139	201	8,689	322	(14,770)	146	[16]18,945	209	1,945
196	195	MacMillan Ring Free Oil Co. Inc.	29,562	100	100,899	265	(3,823)	223	3,858	383	0
197	205	Equitable Petroleum Corp.	29,296	245	3,971	171	(667)	188	7,079	235	1,220
198	—	Kelley Oil & Gas Partners Ltd.[87]	28,723	196	[88]9,008	80	[88]1,265	147	18,941	181	[88]3,252
199	208	Petroleum Development Corp.	28,639	182	12,236	106	213	173	9,512	251	880
200	—	Quadra Oil & Gas Inc.[8,89]	28,269	295	1,386	218	[26](1,613)	—	NA	—	NA
201	—	Saxon Oil Development Partners L.P.[90]	28,236	181	12,369	259	(3,332)	138	[16]22,403	227	1,368
202	168	McFarland Energy Inc.	28,133	187	11,027	319	(14,143)	137	23,533	179	3,271
203	186	KenCope Energy Cos.[29]	27,582	155	20,737	295	(7,845)	145	19,065	142	6,893
204	190	Midland SouthWest Corp.[91]	27,035	162	18,091	325	(15,926)	133	25,112	137	7,278

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
56	2.963	57	27.36	62	14.52	46	469.5	50	2.963	53	27.36	53	14.52	40	469.5	93	12.00
62	2.375	28	81.14	57	19.97	27	1,141.1	54	2.375	26	81.14	46	19.97	24	1,141.1	25	98.00
110	0.631	51	35.43	86	7.647	39	594.6	103	0.631	48	35.43	80	7.647	35	594.6	17	149.10
72	1.593	61	23.45	79	8.811	67	215.3	66	1.568	58	22.77	72	8.741	63	203.1	85	13.50
111	0.612	85	11.09	120	3.901	84	124.0	104	0.612	81	11.09	114	3.901	74	124.0	63	23.87
31	10.32	40	56.76	39	40.55	56	333.1	26	7.140	40	40.87	65	11.48	93	84.47	71	20.70
—	[24]NA	—	[24]NA	—	[24]NA	—	[24]NA	—	[24]NA	—	[24]NA	—	[24]NA	—	[24]NA	—	NA
142	0.311	107	6.130	138	2.783	78	140.0	144	0.263	121	4.678	154	1.674	80	108.9	123	5.62
23	17.20	62	22.30	23	124.4	74	191.6	19	17.20	59	22.30	20	124.4	66	191.6	12	235.40
52	3.407	42	45.07	34	59.84	31	905.5	127	0.427	112	5.442	127	2.948	143	29.06	290	0.25
57	2.936	44	44.11	61	14.86	45	474.1	51	2.936	39	44.11	52	14.86	39	474.1	68	21.00
64	2.289	102	7.098	75	9.973	90	106.2	90	0.879	100	6.179	75	8.338	83	106.2	106	8.37
124	0.493	83	11.60	141	2.697	87	109.1	119	0.493	78	11.60	134	[7]2.697	79	[7]109.1	110	8.01
67	1.989	47	38.65	72	[7]11.37	60	[7]297.3	59	1.989	44	38.65	66	[7]11.37	48	[7]297.3	80	14.62
63	2.343	29	80.32	52	23.06	26	1,168.2	77	1.213	80	11.18	91	6.430	104	67.99	108	8.18
324	0.015	264	0.222	338	[30]0.063	306	[30]1.194	322	0.015	261	0.222	337	[30]0.063	304	[30]1.194	157	3.44
51	3.456	31	71.70	60	[7]16.35	48	[7]410.1	46	3.456	29	71.70	49	[7]16.35	42	[7]410.1	54	29.30
65	2.140	194	1.212	69	11.87	218	6.997	55	2.140	188	1.212	60	11.87	215	6.997	88	13.00
88	1.025	130	4.048	74	10.56	108	77.00	81	1.025	127	4.048	68	10.56	98	77.00	30	79.70
55	3.075	53	34.73	43	31.72	49	373.5	53	2.837	50	34.08	36	29.29	45	359.8	67	21.01
49	3.736	45	40.12	55	22.06	54	343.9	43	3.736	41	40.12	45	21.59	52	262.2	58	25.50
73	1.556	160	2.475	145	2.500	119	55.53	107	0.592	158	2.467	138	2.500	151	26.30	159	3.39
87	1.123	82	12.00	83	8.278	63	245.5	80	1.123	77	12.00	77	8.278	53	245.5	99	10.33
112	0.601	158	2.570	81	8.516	118	57.00	105	0.601	156	2.570	74	8.516	111	57.00	203	1.71
84	1.177	220	0.617	103	5.851	260	2.988	366	0.004	294	0.120	371	0.014	338	0.419	—	NA
148	0.262	289	0.130	49	[38]24.00	345	0.362	145	0.262	286	0.130	42	[38]24.00	344	0.362	167	[37]3.00
105	0.660	48	37.61	109	5.096	55	340.3	113	0.557	45	36.92	117	3.462	51	282.1	107	8.20
61	2.395	50	35.64	63	13.90	53	345.6	56	2.113	47	35.63	63	11.59	58	217.7	50	34.34
80	1.303	69	15.48	96	6.643	79	139.8	75	1.246	71	13.12	98	5.611	95	81.17	89	12.95
44	4.224	64	18.04	41	33.94	66	218.0	49	2.996	61	18.04	38	26.90	57	218.0	83	14.00
153	0.245	144	3.176	151	1.923	102	84.69	150	0.245	142	3.176	145	1.923	92	84.69	122	5.70
95	0.884	80	12.11	106	5.299	100	86.19	89	0.884	75	12.11	101	5.299	90	86.19	52	30.00
69	1.733	55	32.31	65	13.58	69	208.3	61	1.733	52	32.31	56	13.58	60	208.3	152	3.70
46	4.114	56	31.16	54	22.32	59	301.5	60	1.928	56	24.51	64	11.49	73	134.4	—	NA
92	0.936	92	8.864	101	5.976	106	78.92	86	0.936	86	8.864	95	5.976	97	78.92	138	4.72
33	9.188	54	32.97	33	59.96	50	365.9	25	9.188	51	32.97	28	59.96	44	365.9	163	3.10
48	4.000	60	24.40	48	24.40	72	202.6	41	4.000	57	24.40	41	24.40	64	202.6	40	49.50
36	5.828	63	20.52	40	38.12	73	197.3	30	5.828	60	20.52	30	38.12	65	197.3	24	117.43
35	6.036	65	16.40	37	42.50	77	141.1	35	5.405	65	14.66	31	37.17	77	115.7	18	143.40
115	0.569	112	5.718	159	1.683	131	42.59	109	0.569	105	5.718	153	1.683	125	42.59	86	13.10
75	1.482	134	3.734	84	8.189	128	44.50	68	1.482	133	3.734	78	8.189	122	44.50	34	57.00
66	2.000	77	12.80	68	12.30	85	121.7	58	2.000	72	12.80	59	12.30	75	121.7	62	23.94
86	1.158	73	14.35	70	11.84	81	138.1	79	1.158	67	14.35	61	11.84	71	138.1	127	5.40
293	0.026	132	3.802	212	0.682	150	28.69	290	0.026	130	3.802	210	0.682	144	28.69	267	0.50
60	2.727	136	3.668	45	27.31	164	22.02	124	0.456	144	2.968	175	1.271	184	13.12	104	8.83
59	2.800	71	14.60	46	26.90	58	301.6	57	2.000	117	5.100	58	12.50	115	52.40	61	24.00
157	0.234	87	10.29	200	0.849	71	205.8	155	0.234	83	10.29	196	0.849	62	205.8	69	21.00
230	0.078	206	0.927	263	0.267	291	1.744	227	0.078	201	0.927	261	0.267	288	1.744	87	13.10
154	0.243	129	4.180	127	3.301	68	209.3	151	0.243	126	4.180	120	3.301	59	209.3	272	0.46
71	1.656	70	14.92	91	7.093	76	152.9	65	1.656	64	14.92	84	7.093	69	152.9	—	NA
82	1.298	377	0.009	85	7.904	364	0.122	74	1.298	375	0.009	79	7.904	363	0.122	64	23.00

Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
205	194	MSR Exploration Ltd.[92]	26,361	236	4,461	148	(276)	148	18,879	215	1,679
206	—	Fidelity Oil Co.	23,510	180	12,436	54	7,718	141	20,209	—	NA
207	—	Coho Resources Inc.[93]	23,451	324	869	158	(397)	273	1,406	204	2,194
208	—	ZIM Energy Corp.[11]	23,255	242	[94]4,204	275	[94](4,785)	214	4,734	136	[94]7,448
209	206	Baruch-Foster Corp.	22,494	204	8,193	270	(4,074)	161	13,105	198	2,435
210	213	Tucker Drilling Co. Inc.[35]	21,841	153	21,663	233	(2,220)	149	18,619	186	2,995
211	204	Belden & Blake Energy Co.	20,322	211	7,605	308	(10,798)	167	[16]11,164	128	9,062
212	243	Oregon Natural Gas Development Corp.[95]	20,236	190	10,388	183	(833)	169	10,758	157	5,172
213	229	Brock Exploration Corp.[35]	20,119	200	8,690	76	1,389	177	8,429	220	1,475
214	219	Ratex Resources Inc.[8]	18,392	240	4,309	268	(3,921)	362	(10,165)	278	584
215	232	Resource Exploration Inc.[8]	18,303	212	7,307	89	821	158	14,900	197	2,503
216	230	Hershey Oil Co.	18,243	227	5,038	250	(3,012)	159	13,331	178	3,374
217	233	Nugget Oil Corp.[96]	17,742	255	3,182	247	(2,763)	345	(699)	244	957
218	—	Taurus Exploration Inc.[8,97]	17,363	205	8,163	236	(2,422)	181	7,924	140	7,006
219	269	Great American Partners	17,062	267	2,522	284	(6,270)	163	[16]12,620	117	12,194
220	226	Lomak Petroleum Inc.	16,378	186	11,155	207	(1,348)	333	101	192	2,639
221	238	Sabine Royalty Trust	15,751	150	22,565	41	20,797	157	[68]15,122	—	NA
222	255	Swift Energy Co.	15,731	225	5,073	82	1,108	192	6,617	236	1,145
223	216	Adams Resources & Energy Inc.	15,485	108	67,031	70	1,964	358	(6,223)	231	1,29
224	160	Magic Circle Energy Corp.[98]	15,209	174	13,596	94	546	239	2,858	195	2,544
225	248	Barrett Resources Corp.[8]	14,759	234	4,516	241	(2,622)	183	7,898	222	1,421
226	253	Kimbark Oil & Gas Co.	14,108	230	4,781	260	(3,442)	228	3,341	191	2,724
227	202	Trinity Resources Ltd.	13,885	223	5,413	326	(16,351)	198	6,015	234	1,242
228	228	Saxon Oil Co.	13,727	237	4,453	220	(1,755)	165	11,556	298	396
229	260	Oakridge Energy Inc.[99]	13,429	254	3,183	186	(890)	233	3,027	190	2,821
230	258	Michigan Oil Co.[100]	13,204	217	6,639	248	(2,850)	—	NA	139	7,050
231	244	Premier Resources Ltd.[8]	13,069	247	3,863	230	(2,131)	350	(1,625)	248	924
232	218	Petrominerals Corp.[101]	12,879	188	10,456	276	(4,843)	182	7,914	218	1,551
233	242	Bellwether Exploration Co.	12,856	246	3,892	271	(4,093)	243	2,787	219	1,508
234	198	Royal Resources Corp.[29,102]	12,761	241	4,303	324	(15,023)	166	11,364	189	2,854
235	239	Home-Stake Royalty Corp.	12,632	221	6,018	238	(2,534)	171	10,109	205	2,115
236	285	Evergreen Resources Inc.[35]	12,477	280	1,859	167	(557)	189	6,977	165	4,548
237	252	Seahawk Oil International Inc.	12,013	282	1,818	269	(3,954)	207	5,262	281	566
238	261	Vermillion Bay Land Co.[35]	11,969	228	5,033	83	1,094	172	9,804	199	2,369
239	—	Energy Management Corp.	11,293	216	6,858	258	(3,257)	212	4,832	200	2,363
240	247	Norris Oil Co.[29]	11,220	320	[103]917	280	[103](5,762)	179	8,343	237	[103]1,134
241	249	Sage Drilling Co. Inc.[29]	11,049	214	7,224	181	(801)	191	6,860	271	652
242	231	Summit Energy Inc.[104]	10,897	233	4,528	310	(11,019)	206	5,323	226	1,369
243	275	Energy Assets International Corp.[35]	10,889	197	8,994	93	688	216	4,604	260	754
244	270	Geodyne Resources Inc.[105]	10,806	248	3,855	129	(92)	255	2,219	323	197
245	286	Dorchester Hugoton Ltd.	10,524	265	2,576	86	845	175	[16]8,731	196	2,513
246	245	ConVest Energy Corp.[106]	10,507	268	2,473	255	(3,124)	208	5,204	301	348
247	236	Arapaho Petroleum Inc.	10,497	276	2,031	299	(8,392)	290	981	265	673
248	266	Newhall Resources	10,142	193	9,737	72	1,923	176	[16]8,569	295	407
249	276	Thor Energy Resources Inc.[11]	10,001	218	6,407	146	(267)	196	6,286	258	777
250	287	Cobb Resources Corp.[29]	9,859	243	4,132	104	261	193	6,564	187	2,989
251	225	Texon Energy Corp.[96]	9,795	308	1,184	286	(6,567)	285	1,140	239	1,06
252	273	Striker Petroleum Corp.	9,583	291	1,459	225	(1,942)	185	7,513	292	43
253	366	Belcor Inc.[107]	9,458	195	9,484	87	833	241	2,832	293	424
254	264	Permian Basin Royalty Trust	9,359	137	28,656	37	28,154	184	[68]7,881	—	NA
255	263	Dietrich Resources Corp.[18]	9,164	262	2,746	251	(3,030)	232	3,041	214	1,730

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Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
1	626.0	1	1,449.0		6,512.0	1	29,430.0	1	278.0	1	818.0	3	2,627.0	1	17,970.0	3	631.00
7	237.0	2	1,274.0	6	2,460.0	2	20,479.0	8	114.0	6	558.0	8	1,014.0	3	7,855.0	2	754.00
2	382.0	4	860.0	3	3,225.0	5	8,165.0	4	215.0	2	734.0	6	1,654.0	8	5,132.0	7	400.00
3	346.0	5	818.0	2	3,513.0	4	10,081.0	6	199.0	3	719.0	5	1,880.0	4	7,509.0	8	352.00
8	216.0	6	662.0	5	2,762.0	7	7,020.0	5	209.0	4	653.0	2	2,632.0	6	6,788.0	1	1,497.00
4	294.0	3	1,004.0	7	2,424.0	3	15,375.0	7	142.0	5	606.0	7	1,560.0	2	10,270.0	4	603.00
5	267.0	7	575.0	4	2,927.0	8	6,895.0	3	240.0	7	527.0	1	2,728.0	7	5,923.0	9	323.00
16	52.00	10	371.0	16	437.0	12	3,250.0	14	38.00	8	370.0	14	296.0	11	3,245.0	23	117.60
10	119.0	13	265.0	13	728.0	14	2,982.0	15	31.00	13	244.0	16	229.0	14	2,749.0	14	188.20
6	263.1	27	85.50	8	2,406.2	6	7,308.1	2	263.1	24	85.50	4	2,406.2	5	7,308.1	16	155.70
13	84.00	8	401.0	14	718.0	10	5,144.0	13	44.00	10	283.0	12	355.0	12	3,232.0	22	124.00
12	92.03	9	374.9	11	802.8	11	4,816.2	9	63.74	9	308.0	11	628.5	10	3,435.8	6	443.00
14	74.00	14	252.0	12	796.0	15	2,917.0	11	62.00	14	219.0	10	649.0	16	2,377.0	5	552.00
11	98.00	11	362.0	10	882.0	9	6,073.0	10	63.00	11	255.0	9	661.0	9	4,500.0	15	181.00
9	141.0	12	339.0	9	948.0	13	3,114.0	12	46.00	12	248.0	13	317.0	18	1,977.0	13	197.50
40	4.642	17	131.4	38	41.37	23	1,498.6	42	3.913	16	127.3	32	36.00	21	1,434.8	31	75.19
47	4.068	32	70.50	44	28.56	25	1,172.9	40	[7]4.068	30	[7]70.50	37	[7]28.56	23	[7]1,172.9	20	134.00
43	4.295	35	68.05	67	12.70	33	885.0	64	1.667	33	66.09	83	7.096	29	742.3	37	55.00
22	17.71	37	66.73	19	148.1	40	584.3	95	0.822	62	17.80	89	6,659	68	156.3	118	6.29
15	57.00	15	169.0	15	458.0	19	1,936.0	17	25.00	25	84.00	17	201.0	27	822.0	73	20.00
45	4.179	38	66.22	58	19.64	43	527.6	39	4.179	32	66.22	48	18.13	43	402.3	46	37.30
39	4.856	22	112.0	50	23.46	24	1,198.0	36	[7]4.856	20	[7]112.0	43	[7]23.46	22	[7]1,198.0	11	241.00
27	12.20	74	13.90	35	58.20	70	206.8	82	1.000	68	13.90	125	3.000	61	206.8	44	38.00
17	29.53	23	105.6	21	139.9	32	890.0	34	5.408	23	91.69	29	40.95	28	749.6	32	71.40
28	12.00	18	127.0	20	140.0	29	964.0	21	12.00	18	121.0	19	138.0	26	883.0	26	94.40
54	3.086	49	36.30	80	8.596	65	219.8	48	3.086	46	36.30	73	8.596	56	219.8	66	21.71
30	10.70	33	70.37	32	64.48	28	1,000.1	24	10.26	31	70.37	27	60.57	25	1,000.1	28	85.30
26	15.80	36	67.70	27	97.50	35	765.9	27	7.100	34	60.30	33	34.90	34	615.7	57	25.84
38	5.544	24	94.23	51	23.14	18	2,010.7	33	5.544	21	94.23	44	23.14	17	2,010.7	120	6.00
29	11.10	16	145.0	28	93.30	16	2,887.0	23	11.10	15	145.0	23	93.30	13	2,887.0	21	131.40
53	3.400	43	44.30	31	74.90	34	854.1	47	3.200	42	39.30	24	73.20	31	714.2	56	[7]27.12
140	0.318	46	39.00	105	5.388	36	731.7	138	0.318	43	39.00	100	5.388	30	731.7	51	30.54
25	16.00	39	59.90	26	97.60	41	580.5	20	16.00	36	59.90	22	97.60	36	580.5	35	56.60
81	1.300	72	14.50	95	6.700	88	107.2	73	1.300	66	14.50	88	6.700	81	107.2	74	18.80
20	19.40	34	69.30	25	108.8	38	625.1	31	5.800	35	60.20	35	31.30	47	318.5	60	24.60
18	29.00	21	119.0	22	125.0	22	1,553.0	29	6.000	38	46.00	40	25.00	49	290.0	39	52.06
19	26.00	20	122.7	18	165.2	21	1,678.5	16	25.10	19	117.9	18	154.6	20	1,537.2	27	87.00
130	[13]0.428	66	[13]16.14	122	[13]3.799	51	[13]351.0	152	[13]0.242	91	[13]7.747	146	[13]1.903	72	[13]135.9	55	[13]28.71
34	6.337	59	25.52	42	33.10	64	239.2	28	6.337	55	25.52	34	33.10	55	239.2	38	54.90
50	3.462	97	7.844	24	123.4	75	178.2	45	3.462	90	7.844	21	123.4	67	178.2	10	255.80
167	0.203	215	0.740	134	2.876	200	10.04	163	0.203	211	0.740	129	2.876	196	10.04	92	12.26
24	16.50	26	91.80	29	92.60	30	913.2	22	12.00	27	77.50	26	62.10	32	676.8	42	40.70
21	19.00	19	123.0	17	234.0	17	2,534.0	18	19.00	17	123.0	15	234.0	15	2,534.0	41	45.00
42	4.610	58	27.36	30	75.85	37	676.9	37	4.572	54	27.08	25	72.85	33	632.5	19	137.00
74	1.533	52	34.90	82	8.301	44	500.7	67	1.533	49	34.90	76	8.301	38	500.7	33	62.20
199	0.110	140	3.460	367	0.017	155	27.00	195	0.110	138	3.460	366	0.017	150	27.00	—	NA
137	0.367	98	7.577	160	1.662	127	45.04	134	0.367	92	7.577	155	1.662	121	45.04	171	2.99
41	4.641	30	78.75	56	20.08	20	1,756.7	38	4.185	28	77.25	50	16.07	19	1,703.7	29	80.30
37	5.797	25	91.86	47	25.14	42	558.1	32	5.797	22	91.86	39	25.14	37	558.1	47	37.30
143	0.308	81	12.08	196	0.898	89	106.8	140	0.308	76	12.08	192	0.898	82	106.8	36	56.00
32	9.600	41	52.70	36	45.20	57	305.2	44	3.500	37	52.10	51	15.70	54	245.3	90	12.85

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Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
256	221	Western Energy Development Co. Inc.[108]	9,082	297	1,369	274	(4,744)	361	(9,812)	331	178
257	223	Basic Earth Science Systems Inc.[35]	9,079	220	6,259	305	(9,231)	225	3,738	217	1,604
258	246	Home-Stake Oil & Gas Co.	8,429	226	5,042	252	(3,042)	195	6,308	213	1,756
259	298	QED Exploration Inc.[104]	8,353	261	2,764	95	518	197	6,159	206	2,018
260	—	Com-Tek Resources Inc.[6]	8,334	312	1,103	156	(374)	209	5,151	311	276
261	259	Pyramid Oil Co.	8,320	224	5,388	66	2,997	186	7,353	250	890
262	283	Amcole Energy Corp.[29]	8,035	229	4,799	176	(747)	292	941	228	1,339
263	256	Usenco Inc.[107]	8,028	259	2,807	216	(1,559)	242	2,805	233	1,243
264	282	Golden Oil Co.[29]	8,011	266	2,574	139	(207)	210	5,028	302	343
265	272	Burkhart Petroleum Corp.	7,754	260	2,765	253	(3,055)	351	(1,754)	262	727
266	234	Jackson Exploration Inc.	7,689	209	7,647	278	(5,493)	288	1,086	290	442
267	214	Partners Oil Co.	7,493	251	3,474	53	7,763	230	3,277	247	931
268	290	Panhandle Royalty Co.[6]	7,010	256	3,135	97	485	219	4,291	268	660
269	—	Coseka Resources Ltd.[58]	6,957	219	6,377	90	[109]797	—	NA	161	4,928
270	271	Houston Oil Royalty Trust	6,957	264	2,633	69	2,131	190	[68]6,957	—	NA
271	280	GeoResources Inc.	6,950	272	2,259	234	(2,312)	221	4,054	269	656
272	265	Petromark Resources Co.	6,926	269	2,359	287	(6,708)	263	1,878	259	771
273	210	Petroleum Reserve Corp.[29,110]	6,879	232	4,664	293	(7,689)	315	452	230	1,299
274	268	Petrotech Inc.	6,868	258	2,934	273	(4,402)	355	(3,300)	306	317
275	312	Intercontinental Energy Corp.[6]	6,787	278	2,015	237	(2,433)	344	(615)	289	447
276	291	Alta Energy Corp.[29]	6,691	293	1,405	130	(94)	274	1,399	313	250
277	279	Altex Industries Inc.[6]	6,667	275	2,040	249	(2,905)	200	5,776	288	462
278	277	Nahama & Weagant Energy Co.[11]	6,625	298	1,365	266	(3,832)	217	4,460	224	1,408
279	302	Bayou Resources Inc.[111]	6,607	270	2,355	125	(45)	238	2,892	277	593
280	294	Mustang Cos. Inc.	6,493	253	3,229	327	(16,912)	199	5,969	261	751
281	—	Castle Energy Corp.[6]	6,382	250	[112]3,691	102	[112]311	295	803	245	[112]947
282	262	Strata Corp.[113]	6,363	257	3,079	290	(7,113)	360	(9,753)	347	78
283	315	Falcon Oil & Gas Co. Inc.	6,270	310	1,124	103	287	215	4,648	240	1,052
284	295	Credo Petroleum Corp.[107]	6,143	326	850	179	(777)	201	5,775	316	238
285	303	Prima Energy Corp.[29]	6,139	283	1,807	110	112	203	5,350	314	242
286	305	Whiting Petroleum Corp.	6,045	274	2,107	107	201	204	5,338	273	648
287	332	Black Gold Energy Resources Inc.[35]	5,945	305	1,236	99	385	252	2,355	202	2,234
288	—	Fountain Oil & Gas Inc.[114]	5,848	304	1,244	217	(1,571)	289	1,015	172	3,997
289	317	Wepco Energy Co.	5,651	307	1,191	166	(553)	231	3,176	225	1,407
290	284	Great Eastern Energy & Development Corp.	5,609	290	1,499	88	828	220	4,271	282	560
291	293	Gerber Energy International Inc.	5,577	287	1,586	221	(1,834)	237	2,899	246	939
292	299	Peninsula Resources Corp.	5,507	277	2,020	256	(3,126)	366	(18,475)	353	70
293	—	Valex Petroleum Inc.	5,360	292	1,421	141	(220)	224	3,786	332	177
294	241	Monogram Oil & Gas Inc.[107]	5,171	285	1,700	315	(12,449)	356	(4,683)	378	2
295	—	Kelley Oil Corp.	4,999	244	4,082	155	(357)	251	2,371	252	844
296	318	Burton-Hawks Inc.	4,966	271	2,286	174	(699)	247	2,623	315	242
297	—	Wexco of Delaware Inc.[115]	4,960	318	990	165	[116](550)	222	3,892	241	1,013
298	310	Dallas Oil & Minerals Inc.	4,889	314	1,015	169	(585)	213	4,821	223	1,413
299	307	K.R.M. Petroleum Corp.	4,881	279	1,957	204	(1,274)	262	1,895	300	371
300	308	Parallel Petroleum Corp.	4,737	329	773	227	(2,036)	227	3,374	253	831
301	289	Greenwood Resources Inc.	4,676	317	994	235	(2,329)	338	(98)	335	158
302	300	Henry Energy Corp.[29]	4,531	238	4,393	224	(1,897)	250	2,411	216	1,621
303	—	Paloma Petroleum Ltd.[56]	4,492	385	201	200	(1,154)	218	4,359	386	(36)
304	330	Energy Capital Development Corp.	4,415	362	375	182	(804)	266	1,703	249	924
305	325	NP Energy Corp.[35]	4,244	345	593	128	(80)	277	1,299	321	209
306	274	Oxford Consolidated Inc.[35,118]	4,221	273	2,233	297	(8,192)	268	1,633	185	3,020

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
198	0.111	318	0.089	170	1.326	270	2.598	194	0.111	316	0.089	167	1.326	268	2.598	—	—
190	0.135	267	0.218	187	1.072	246	3.687	186	0.135	264	0.218	184	1.072	244	3.687	224	1.13
163	0.211	205	0.949	191	1.020	213	7.951	159	0.211	200	0.949	186	1.020	210	7.951	162	3.11
214	0.092	256	0.283	242	0.405	271	2.559	210	0.092	253	0.283	240	0.405	269	2.559	103	9.18
256	0.048	329	0.074	174	1.290	226	5.935	253	0.048	327	0.074	171	1.290	223	5.935	—	—
192	0.132	347	0.037	182	1.124	333	0.506	188	0.132	345	0.037	179	1.124	331	0.506	143	4.00
315	0.016	277	0.168	313	0.121	238	4.336	312	0.016	274	0.168	311	0.121	236	4.336	—	—
210	0.095	279	0.158	148	2.091	247	3.587	206	0.095	276	0.158	142	2.091	245	3.587	117	6.30
233	0.074	253	0.302	165	1.515	275	2.359	230	0.074	250	0.302	161	1.515	273	2.359	183	2.20
245	0.059	248	0.323	252	0.321	256	3.110	242	0.059	245	0.323	250	0.321	254	3.110	242	0.88
229	0.078	246	0.330	233	0.443	279	2.138	226	0.078	243	0.330	231	0.443	277	2.138	—	—
234	0.073	236	0.438	350	0.047	327	0.598	231	0.073	233	0.438	349	0.047	325	0.598	311	0.04
246	0.059	207	0.891	274	0.219	216	7.188	243	0.059	202	0.891	272	0.219	214	7.188	268	0.50
150	0.250	195	1.201	192	0.999	259	3.000	147	0.250	189	1.201	187	0.999	257	3.000	112	8.00
291	0.027	216	0.734	284	0.184	237	4.417	288	0.027	212	0.734	282	0.184	235	4.417	—	—
209	0.096	349	0.035	202	0.827	359	0.173	205	0.096	347	0.035	198	0.827	358	0.173	190	2.00
206	0.099	237	0.416	220	0.629	267	2.690	202	0.099	234	0.416	218	0.629	265	2.690	179	2.49
177	0.165	203	0.982	197	0.889	232	5.294	173	0.165	197	0.982	193	0.889	230	5.294	59	25.00
195	0.124	247	0.327	214	0.665	257	3.044	192	0.124	244	0.327	212	0.665	255	3.044	257	0.64
266	0.044	299	0.116	321	0.106	329	0.594	263	0.044	297	0.116	319	0.106	327	0.594	—	—
281	0.032	293	0.125	249	0.342	222	6.169	278	0.032	290	0.125	247	0.342	219	6.169	259	0.62
262	0.047	336	0.058	303	0.141	361	0.143	259	0.047	334	0.058	301	0.141	360	0.143	293	0.20
321	0.015	250	0.312	244	0.403	251	3.339	319	0.015	247	0.312	242	0.403	249	3.339	221	1.20
259	0.048	201	1.044	259	0.287	196	10.49	256	0.048	196	1.044	257	0.287	193	10.49	263	0.58
303	0.021	255	0.283	301	0.143	258	3.029	300	0.021	252	0.283	299	0.143	256	3.029	131	5.09
255	[112]0.050	231	[112]0.476	293	0.163	245	3.759	252	[112]0.050	228	[112]0.476	291	0.163	243	3.759	176	[112]2.75
274	0.037	227	0.499	278	0.196	249	3.508	271	0.037	224	0.499	276	0.196	247	3.508	—	—
300	0.022	257	0.263	290	0.171	182	15.11	297	0.022	254	0.263	288	0.171	178	15.11	—	—
320	0.016	346	0.040	356	0.030	300	1.355	318	0.016	344	0.040	355	0.030	298	1.355	238	0.94
340	0.011	311	0.101	362	0.022	301	1.340	338	0.011	309	0.101	361	0.022	299	1.340	229	1.04
265	0.046	287	0.133	289	0.172	274	2.385	262	0.046	284	0.133	287	0.172	272	2.385	—	—
283	0.031	291	0.129	186	1.085	209	8.737	280	0.031	288	0.129	183	1.085	205	8.737	102	9.22
269	0.040	270	0.193	227	0.501	280	2.121	266	0.040	267	0.193	225	0.501	278	2.121	—	NA
302	0.021	258	0.259	253	0.316	272	2.505	299	0.021	255	0.259	251	0.316	270	2.505	306	0.07
244	0.061	305	0.106	291	0.168	325	0.653	241	0.061	303	0.106	289	0.168	323	0.653	126	5.45
271	0.039	298	0.118	226	0.529	317	0.905	268	0.039	296	0.118	223	0.529	315	0.905	278	0.38
348	0.009	333	0.065	—	—	—	—	346	0.009	331	0.065	—	—	—	—	256	0.65
250	0.055	265	0.220	171	1.320	263	2.924	247	0.055	262	0.220	168	1.320	261	2.924	—	—
310	0.019	228	0.488	336	0.072	255	3.144	307	0.019	225	0.488	335	0.072	253	3.144	313	0.03
355	0.007	233	0.457	347	0.050	214	7.649	353	0.007	229	0.457	346	0.050	211	7.649	244	0.84
249	0.056	316	0.090	199	0.854	264	2.840	246	0.056	314	0.090	195	0.854	262	2.840	273	0.46
279	0.034	282	0.149	312	0.122	304	1.270	276	0.034	279	0.149	310	0.122	302	1.270	227	1.05
304	0.021	261	0.234	319	0.109	292	1.728	301	0.021	258	0.234	317	0.109	289	1.728	239	0.94
223	0.084	254	0.284	240	0.414	225	6.054	219	0.084	251	0.284	238	0.414	222	6.054	202	1.72
308	0.019	275	0.174	266	0.256	283	2.026	305	0.019	272	0.174	264	0.256	281	2.026	206	1.59
282	0.032	252	0.310	295	0.161	286	1.964	279	0.032	249	0.310	293	0.161	284	1.964	310	0.04
231	0.078	341	0.044	279	0.194	350	0.294	228	0.078	339	0.044	277	0.194	349	0.294	137	4.97
347	[117]0.009	353	[117]0.033	373	[117]0.013	354	[117]0.233	345	[117]0.009	351	[117]0.033	373	[117]0.013	353	[117]0.233	—	NA
356	0.006	323	0.079	245	0.390	199	10.14	354	0.006	321	0.079	243	0.390	195	10.14	—	—
378	0.001	283	0.145	324	0.100	221	6.501	377	0.001	280	0.145	322	0.100	218	6.501	—	NA
236	0.071	242	0.354	241	0.410	266	2.813	233	0.071	239	0.354	239	0.410	264	2.813	128	5.37

Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
307	—	Twin Richfield Oils Inc.[119]	3,928	364	362	120	(26)	259	2,068	356	67
308	346	Arch Petroleum Inc.	3,731	309	1,137	211	(1,452)	276	1,323	338	150
309	—	Republic Resources Corp.	3,601	327	[120]787	201	[120](1,205)	272	1,452	346	[120]80
310	358	Roseland Oil & Gas Inc.[121]	3,570	299	1,316	98	396	281	1,183	267	663
311	—	Normandy Oil & Gas Co. Inc.[29]	3,545	281	1,858	229	(2,072)	245	2,668	264	689
312	335	Southern Mineral Corp.	3,505	284	1,762	100	315	240	2,835	254	809
313	321	Tyrex Oil Co.[25]	3,433	347	585	187	(890)	226	3,422	256	786
314	313	Columbine Exploration Corp.[70]	3,417	302	1,270	202	(1,222)	349	(1,176)	324	190
315	340	Crescent Oil & Gas Corp.[6]	3,361	367	329	154	(356)	235	2,990	320	219
316	343	Aspen Exploration Corp.[29]	3,295	316	1,011	138	(190)	236	2,961	337	154
317	326	Lyric Energy Inc.[96]	3,215	348	577	195	(985)	298	733	354	68
318	345	Plano Petroleum Corp.[6]	3,063	338	653	145	(258)	234	3,001	294	420
319	316	Roberts Oil & Gas Inc.[18]	3,006	343	618	231	(2,134)	275	1,325	257	780
320	361	Exploration Co.[23]	2,934	361	379	205	(1,298)	257	2,103	274	632
321	—	Ranger Oil Ltd.[58]	2,927	249	3,799	192	(951)	—	NA	—	NA
322	257	Chaparral Resources Inc.[70]	2,911	328	785	304	(9,095)	249	2,463	287	471
323	—	Penn Pacific Corp.[6]	2,891	349	556	214	(1,484)	354	(3,183)	384	0
324	337	Pantepec International Inc.	2,852	394	92	147	(267)	244	2,718	—	NA
325	—	Energy Resources of North Dakota Inc.[35]	2,750	306	1,233	190	(936)	248	2,473	238	1,111
326	—	Mineral Development Inc.[35,122]	2,741	296	1,381	127	(50)	312	502	350	75
327	320	Appalachian Oil & Gas Co. Inc.[29]	2,705	368	[123]326	123	[123](37)	318	388	272	[123]649
328	352	Intramerican Oil & Minerals Inc.	2,681	339	649	91	736	256	2,141	342	123
329	355	Double Eagle Petroleum & Mining Co.[23]	2,613	319	957	159	(397)	254	2,264	276	599
330	—	Sierra Exploration Co.[124]	2,598	286	1,640	291	(7,365)	346	(706)	325	188
331	254	Seaxe Energy Corp.[125]	2,590	391	113	313	(12,019)	264	1,800	297	397
332	342	Nova Natural Resources Corp.[6,126]	2,579	332	764	228	(2,061)	343	(536)	333	173
333	—	Keldon Oil Co.[104]	2,566	352	506	62	3,634	297	745	210	1,872
334	224	Wichita Industries Inc.[124]	2,510	288	1,554	283	(6,095)	308	524	263	691
335	—	Pathfinder Petroleum Corp.[121]	2,480	323	874	193	(963)	321	355	270	653
336	357	Questa Oil & Gas Co.	2,441	321	915	119	(16)	267	1,667	283	526
337	336	Albion International Resources Inc.	2,269	357	434	177	(747)	280	1,200	319	223
338	347	Crown Resource Corp.	2,256	351	541	215	(1,523)	258	2,100	279	584
339	—	Castle Royalty Limited Partnership	2,055	378	238	168	(562)	260	[18]2,008	380	1
340	—	Western Energy Resources Inc.	1,954	375	248	172	(689)	261	1,900	367	26
341	323	Petrol Industries Inc.	1,931	294	1,400	223	(1,864)	265	1,731	343	115
342	356	Reef Energy Corp.	1,925	303	1,264	157	(390)	313	495	284	516
343	367	Willard Pease Oil & Gas Co.	1,888	333	707	142	(236)	304	643	341	133
344	363	Sunbelt Exploration Inc.[23]	1,717	355	451	151	(326)	284	1,147	368	22
345	365	Impact Energy Inc	1,657	377	240	164	(508)	269	1,633	385	0
346	—	Taurus Petroleum Inc.[6]	1,646	341	629	153	(354)	303	648	339	147
347	371	Big Piney Oil & Gas Co.	1,641	384	206	126	(46)	270	1,540	340	142
348	341	Reserve Exploration Co.[35]	1,623	325	868	226	(2,009)	310	503	286	480
349	360	Love Oil Co. Inc.[18]	1,622	381	211	197	(1,071)	271	1,503	326	188
350	—	International Royalty & Oil Co.[6]	1,610	383	209	199	(1,123)	332	106	317	233
351	379	Pioneer Oil & Gas Corp.[6]	1,608	350	546	109	118	278	1,270	299	393
352	348	Toklan Oil Corp.[23]	1,534	311	1,111	212	(1,475)	293	903	307	314
353	324	Midwest Exploration Inc.[6]	1,490	337	665	232	(2,142)	339	(111)	330	181
354	329	Eagle Exploration Co.[35]	1,477	289	1,518	242	(2,633)	357	(5,243)	285	500
355	339	Hubco Exploration Inc.	1,432	334	704	209	(1,376)	342	(212)	334	170
356	364	Wicklund Petroleum Corp.	1,430	356	437	152	(345)	287	1,122	355	68
357	338	Western Natural Gas Co.	1,420	263	2,709	246	(2,759)	334	93	266	668

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
—	—	297	0.119	—	—	285	1.966	—	—	295	0.119	—	—	283	1.966	283	0.33
276	0.037	273	0.180	325	0.098	313	1.008	273	0.037	270	0.180	323	0.098	311	1.008	304	0.10
359	[120]0.006	359	[120]0.027	370	0.015	363	0.138	357	[120]0.006	357	[120]0.027	369	0.015	362	0.138	—	—
288	0.028	296	0.120	292	0.167	338	0.444	285	0.028	293	0.120	290	0.167	336	0.444	—	NA
369	0.003	300	0.113	268	0.246	312	1.010	368	0.003	298	0.113	266	0.246	310	1.010	287	0.30
337	0.011	212	0.781	340	0.063	235	4.911	336	0.011	207	0.781	338	0.063	233	4.911	228	1.05
330	0.014	378	0.007	351	0.043	368	0.092	328	0.014	376	0.007	350	0.043	367	0.092	230	1.02
270	0.040	301	0.113	—	—	—	—	267	0.040	299	0.113	—	—	—	—	258	0.63
366	0.004	324	0.079	366	0.019	241	3.986	364	0.004	322	0.079	365	0.019	239	3.986	139	4.50
267	0.042	366	0.019	256	0.298	326	0.618	264	0.042	364	0.019	254	0.298	324	0.618	309	0.05
353	0.007	325	0.079	308	0.127	250	3.455	351	0.007	323	0.079	306	0.127	248	3.455	265	0.55
307	0.020	334	0.063	331	0.076	321	0.755	304	0.020	332	0.063	330	0.076	319	0.755	178	2.50
325	0.015	306	0.105	358	0.028	284	2.008	323	0.015	304	0.105	357	0.028	282	2.008	226	1.10
346	0.009	326	0.079	365	0.019	344	0.379	344	0.009	324	0.079	364	0.019	343	0.379	246	0.83
186	0.143	185	1.367	309	0.123	323	0.687	183	0.143	179	1.367	307	0.123	321	0.687	269	0.50
341	0.010	302	0.112	298	0.152	244	3.800	339	0.010	300	0.112	296	0.152	242	3.800	—	—
350	0.008	285	0.141	349	0.048	294	1.669	348	0.008	282	0.141	348	0.048	291	1.669	—	—
379	0.001	355	0.032	372	0.014	288	1.888	378	0.001	353	0.032	372	0.014	297	1.415	222	1.20
299	0.024	387	(s)	323	0.100	384	0.001	296	0.024	386	(s)	321	0.100	384	0.001	175	2.83
295	0.026	292	0.127	275	0.210	296	1.586	292	0.026	289	0.127	273	0.210	293	1.586	158	3.40
389	[123](s)	310	[123]0.103	385	0.001	201	9.825	388	[123](s)	308	[123]0.103	385	0.001	197	9.825	245	[123]0.83
323	0.015	266	0.219	283	0.186	277	2.250	321	0.015	263	0.219	281	0.186	275	2.250	—	—
272	0.039	330	0.071	265	0.257	305	1.195	269	0.039	328	0.071	263	0.257	303	1.195	210	1.51
220	0.090	281	0.152	257	0.295	295	1.660	216	0.090	278	0.152	255	0.295	292	1.660	—	—
376	0.001	362	0.025	288	0.177	254	3.215	375	0.001	360	0.025	286	0.177	252	3.215	—	—
309	0.019	331	0.070	294	0.163	330	0.544	306	0.019	329	0.070	292	0.163	328	0.544	—	—
342	0.009	363	0.024	250	0.326	289	1.805	340	0.009	361	0.024	248	0.326	286	1.805	—	NA
211	0.094	322	0.083	247	0.359	—	—	207	0.094	320	0.083	245	0.359	—	—	—	—
—	NA	—	NA	335	0.075	331	0.524	—	NA	—	NA	334	0.075	329	0.524	237	0.95
338	0.011	271	0.192	339	0.063	262	2.961	335	0.011	268	0.192	339	0.063	259	2.961	177	2.57
322	0.015	342	0.043	251	0.322	311	1.069	320	0.015	340	0.043	249	0.322	309	1.069	—	—
296	0.026	—	—	354	0.033	—	—	293	0.026	—	—	353	0.033	—	—	235	1.00
363	0.005	339	0.053	353	0.038	342	0.408	361	0.005	337	0.053	352	0.038	341	0.408	—	NA
362	0.005	315	0.092	299	0.144	290	1.751	360	0.005	313	0.092	297	0.144	287	1.751	—	—
222	0.088	370	0.017	99	6.401	339	0.431	218	0.088	368	0.017	93	6.401	337	0.431	—	—
287	0.029	278	0.165	320	[30]0.107	307	[30]1.152	284	0.029	275	0.165	318	[30]0.107	305	[30]1.152	280	0.38
273	0.037	327	0.075	258	0.288	273	2.458	270	0.037	325	0.075	256	0.288	271	2.458	261	0.61
387	(s)	304	0.110	387	0.001	302	1.319	386	(s)	302	0.110	387	0.001	300	1.319	—	—
335	0.012	—	—	317	0.112	—	—	333	0.012	—	—	315	0.112	—	—	—	—
344	0.009	274	0.175	326	0.095	299	1.459	342	0.009	271	0.175	324	0.095	296	1.459	—	—
—	—	317	0.090	—	—	282	[30]2.073	—	—	315	0.090	—	—	280	[30]2.073	—	—
278	0.034	344	0.041	272	0.232	357	0.197	275	0.034	342	0.041	270	0.232	356	0.197	253	0.69
360	0.006	382	0.003	371	0.014	381	0.010	358	0.006	381	0.003	370	0.014	381	0.010	294	0.20
382	0.001	373	0.014	381	[30]0.008	358	[30]0.187	381	0.001	371	0.014	381	[30]0.008	357	[30]0.187	—	—
377	0.001	—	—	311	0.123	278	2.212	376	0.001	—	—	309	0.123	276	2.212	191	2.00
318	0.016	249	0.316	330	0.077	315	0.925	316	0.016	246	0.316	329	0.077	313	0.925	240	0.91
294	0.026	314	0.096	246	0.383	320	0.779	291	0.026	312	0.096	244	0.383	318	0.779	288	0.30
268	0.042	290	0.130	348	0.049	352	0.239	265	0.042	287	0.130	347	0.049	351	0.239	217	1.30
289	0.028	309	0.104	333	0.075	322	0.717	286	0.028	307	0.104	332	0.075	320	0.717	—	—
364	0.004	284	0.144	344	0.053	309	1.131	362	0.004	281	0.144	343	0.053	307	1.131	299	0.13
339	0.011	268	0.201	352	0.041	349	0.297	337	0.011	265	0.201	351	0.041	348	0.297	249	0.77

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Rank by total assets 1986	Rank by total assets 1985	Company	Total assets $000	Total revenue Rank	Total revenue $000	Net income Rank	Net income $000	Stockholders' equity Rank	Stockholders' equity $000	Capital & Expl. spending Rank	Capital & Expl. spending $000
358	—	Sheffield Exploration Co. Inc.[29]	1,372	344	612	208	(1,372)	279	1,241	275	626
359	376	EMC Energies Inc.[29]	1,366	336	667	135	(155)	301	667	312	270
360	327	Pangea Petroleum Co.	1,365	313	1,083	173	(689)	322	332	345	98
361	374	Sharon Energy Ltd.[35]	1,361	371	317	134	(125)	341	(142)	303	340
362	306	South Texas Drilling & Exploration Inc	1,348	330	770	84	1,075	282	1,167	370	18
363	—	Carmel Energy Inc.	1,292	322	875	188	(899)	328	215	291	442
364	373	Cheyenne Resources Inc.	1,253	374	258	178	(758)	302	667	318	224
365	—	Bengal Oil & Gas Corp.	1,240	372	291	198	(1,121)	337	(93)	322	203
366	386	Golden Triangle Royalty & Oil Inc.	1,161	393	102	149	(318)	283	1,158	304	326
367	—	Comanche Oil Exploration Inc.[35]	1,151	397	49	170	(611)	286	1,130	369	21
368	381	Bolyard Oil & Gas Ltd.[96]	1,132	365	355	122	(31)	309	520	365	32
369	382	TPEX Exploration Inc.[29]	1,110	331	766	112	109	306	549	327	187
370	383	Tri-Valley Corp.[104]	1,085	346	591	114	27	311	503	310	278
371	380	Wyoming Oil & Minerals Inc.[105]	1,073	382	211	136	(159)	314	489	373	16
372	334	Melton Drilling & Exploration Co.	1,048	342	622	240	(2,571)	336	(82)	362	37
373	333	Circle Seven Oil & Gas Inc.[18]	1,037	335	696	175	(721)	291	959	280	572
374	368	Oil City Petroleum Inc.[23]	1,024	373	288	203	(1,224)	300	689	374	15
375	349	Hipoint Investments Ltd.	932	353	475	219	(1,709)	367	(19,612)	348	78
376	—	Hughes Texas Petroleum Corp.	866	369	324	115	18	316	406	352	73
377	399	Sterling Oil of Oklahoma Inc.	856	379	225	118	(1)	294	838	357	66
378	281	J.M. Resources Inc.[29]	835	301	1,286	257	(3,150)	347	(732)	375	12
379	—	Tiber Resources Inc.[128]	826	376	241	267	(3,847)	—	NA	377	4
380	—	United Western Energy Corp.[121]	820	359	413	189	(920)	335	4	344	109
381	375	Yellowstone Resources Inc.	762	387	165	191	(946)	296	754	329	184
382	385	Amacan Resources Corp.[96]	742	360	396	144	(253)	299	713	366	32
383	—	Bowtex Energy (Canada) Corp.[35,58]	717	386	188	131	(109)	--	NA	363	36
384	—	Bristol Oil & Gas Inc.[29]	700	366	349	143	(239)	323	314	328	186
385	—	Noarko Resources Inc.[8,124]	696	315	1,015	254	(3,104)	340	(112)	358	66
386	—	ORS Corp.[107,129]	689	300	1,313	316	(13,088)	359	(9,607)	305	325
387	395	Texas Vanguard Oil Co.	662	358	426	111	110	307	534	372	17
388	370	Diablo Oil Co.[70,124]	656	370	320	210	(1,384)	324	306	351	75
389	—	Katy Energy Corp.[18]	654	363	367	116	12	326	253	359	55
390	—	Crown Energy Corp.[130]	573	399	1	121	(30)	305	572	381	1
391	400	Pan Energy Resources Inc.[29]	501	340	630	96	486	317	404	379	2
392	391	Bronco Oil & Gas Co.[8]	493	389	126	196	(1,054)	348	(1,153)	371	18
393	351	Kee Exploration Inc.[124]	420	354	472	239	(2,546)	352	(1,871)	360	47
394	388	Score Exploration Corp.[29]	405	388	128	163	(483)	319	387	167	4,416
395	—	Five Star Energy Corp.[29]	388	398	18	132	(112)	327	244	—	NA
396	—	Croff Oil Co.	385	390	121	124	(43)	329	215	361	45
397	398	Houston Oil & Energy Inc.[29]	384	392	106	133	(112)	320	367	336	156
398	389	Amber Resources Co.	313	380	225	162	(482)	325	276	376	5
399	393	Shaw Resources Inc.[35]	151	396	71	160	(418)	331	144	309	283
400	397	Imperial Energy Corp.[8]	149	395	84	150	(325)	330	145	364	34
		Totals	495,345,856		422,268,155		5,201,456		173,875,414		44,032,895

NA = Not Available. (s) indicates less than 500 bbl or 500 mcf. Fiscal yearend is Dec. 31 unless otherwise noted. 1. Currently operating under Chapter 11. 2. Since fiscal yearend company has become a wholly owned subsidiary of British Petroleum Co. 3. Formerly listed as Marathon and Texas Oil & Gas. 4. Operating income before foreign income tax. 5. Subsidiary of E.I. du Pont de Nemours Co. 6. After tax operating income. 7. May include insignificant amounts in Canada. 8. Fiscal yearend Sept. 30. 9. Since fiscal yearend company has split into two separate companies—Maxus Corp. and Diamond Shamrock Refining & Marketing Corp. 10. Subsidiary of Burlington Northern Inc. 11. Fiscal yearend Jan. 31, 1987. 12. Formerly Champlin Petroleum. Subsidiary of Union Pacific Corp. 13. Includes both cost-of-service and non-cost-of-service properties. 14. Subsidiary of Goodyear Tire & Rubber Co. Since fiscal yearend Exxon has reached agreement with Goodyear to purchase Celeron. 15. Unocal owns 95% of partnership units. 16. Partner's capital. 17. Subsidiary of Broken Hill Proprietary Co. Ltd. 18. Fiscal yearend May 31. 19. Transco owns 71.5% of partnership units. 20. Enserch owns 86% of partnership units. 21. Subsidiary of W.R. Grace. 22. Identifiable assets. 23. Fiscal yearend Aug. 31. 24. Company holds oil and gas reserves within the U.S. but is not required to disclose them under Securities and Exchange Commission rules. 25. Subsidiary of Santa Fe Southern Pacific Corp. 26. Operating income. 27. Freeport-McMoRan owns 87.3% of partnership units. 28. General partnership owned equally by Union Texas and Ultramar. 29. Fiscal yearend June 30. 30. Proved developed reserves. 31. Apache owns 6.1% of partnership units. 32. Net savings. 33. Member and patron equities. 34. Subsidiary of Moore McCormack Resources Inc. 35. Fiscal yearend March 31. 36. Based on a 1985 estimate. 37. Gas wells only. 38. Formerly listed as Texas Gas Transmission. Subsidiary of CSX Corp. 39. Diamond Shamrock owns 80% of partnership units. 40. Subsidiary of Houston Industries Inc. 41. Includes operating expenses for oil and gas operations. 42. Santa Fe Energy owns 80% of partnership units. 43. Formerly Petro-Lewis Corp. 44. Previously listed under parent company, Pacific Lighting Corp. 45. Defined net income including income taxes. 46. Net margins. 47. Capital stock and members' equity. 48. Mesa Limited Partnership owns 30% of partnership units. 49. Subsidiary of DeKalb Corp. 50. Operating income before interest and income taxes. 51. Formerly Templeton Energy. 52. Subsidiary of Angeles Corp. 53. Subsidiary of Hiram Walker Resources Ltd. 54. Subsidiary of Consumers Power Co. 55. May include insignificant amounts in Australia. 56. Since fiscal yearend company has sold 95% of U.S. reserves. 57. Subsidiary of Placer Development Ltd. 58. U.S operations only. 59. Subsidiary of Southdown Inc. 60. Subsidiary of Kaiser Aluminum & Chemical Corp. 61. Formerly Hadson Petroleum Corp. 62. Subsidiary of Homestake Mining Co. 63. Subsidiary of Cortez International Ltd. Company has assets and reserves but is not currently an operating entity, thus no revenues, income or production. 64. Subsidiary of PS Group Inc. 65. Kaneb Services owns 80.5% of partnership units. 66. Figures are for the period from creation on Feb. 7, 1986 through Dec. 31, 1986. 67. Since fiscal yearend company has been purchased by Questar. 68. Trust corpus. 69. Company emerged from Chap. 11 on Jan. 30, 1987

Worldwide liquids production		Worldwide natural gas production		Worldwide liquids reserves		Worldwide natural gas reserves		U.S. liquids production		U.S. natural gas production		U.S. liquids reserves		U.S. natural gas reserves		U.S. net wells drilled	
Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Mill bbl	Rank	Bcf	Rank	Wells
313	0.017	348	0.035	346	0.050	336	0.473	310	0.017	346	0.035	345	0.050	334	0.473	281	0.35
333	0.012	340	0.045	304	0.134	324	0.654	331	0.012	338	0.045	302	0.134	322	0.654	251	0.76
284	0.031	241	0.371	273	0.222	297	1.583	281	0.031	238	0.371	271	0.222	294	1.583	—	—
357	0.006	338	0.056	310	0.123	328	0.595	355	0.006	336	0.056	308	0.123	326	0.595	—	NA
385	0.001	372	0.015	384	0.001	380	0.016	384	0.001	370	0.015	384	0.001	380	0.016	—	—
228	0.078	—	—	206	0.778	—	—	226	0.078	—	—	203	0.778	—	—	—	—
343	0.009	358	0.027	318	0.112	341	0.409	341	0.009	356	0.027	316	0.112	340	0.409	—	—
383	0.001	276	0.170	383	0.004	303	1.287	382	0.001	273	0.170	382	0.004	301	1.287	307	0.06
381	0.001	379	0.007	378	0.009	374	0.080	380	0.001	377	0.007	378	0.009	373	0.080	—	NA
375	0.001	—	—	269	0.245	—	—	374	0.001	—	—	267	0.245	—	—	—	—
372	0.002	332	0.069	376	0.011	269	2.600	371	0.002	330	0.069	376	0.011	267	2.600	274	0.45
298	0.024	312	0.099	307	0.127	332	0.518	295	0.024	310	0.099	305	0.127	330	0.518	—	—
390	(s)	288	0.130	388	(s)	337	0.464	389	(s)	285	0.130	388	(s)	335	0.464	289	0.28
334	0.012	369	0.017	316	0.113	319	0.822	332	0.012	367	0.017	314	0.113	317	0.822	—	—
367	0.004	345	0.041	368	0.017	373	0.081	365	0.004	343	0.041	367	0.017	372	0.081	308	0.05
358	0.006	307	0.105	359	0.027	335	0.486	356	0.006	305	0.105	358	0.027	333	0.486	241	0.88
317	0.016	371	0.017	328	0.080	367	0.098	315	0.016	369	0.017	327	0.080	366	0.098	169	3.00
329	0.014	313	0.097	342	0.054	343	0.399	327	0.014	311	0.097	341	0.054	342	0.399	295	0.17
—	—	321	0.086	—	—	—	[127]NA	—	—	319	0.086	—	—	—	[127]NA	284	0.32
370	0.002	365	0.020	369	0.017	348	0.304	369	0.002	363	0.020	368	0.017	347	0.304	192	2.00
275	0.037	337	0.057	300	0.143	353	0.235	272	0.037	335	0.057	298	0.143	352	0.235	—	—
319	0.016	356	0.032	341	0.057	371	0.090	317	0.016	354	0.032	340	0.057	370	0.090	—	NA
351	0.008	328	0.075	364	0.021	314	0.927	349	0.008	326	0.075	363	0.021	312	0.927	170	3.00
349	0.008	374	0.012	345	0.052	365	0.107	347	0.008	372	0.012	344	0.052	364	0.107	315	0.01
332	0.013	343	0.041	343	[30]0.053	347	[30]0.330	330	0.013	341	0.041	342	[30]0.053	346	[30]0.330	302	0.11
391	(s)	385	(s)	205	0.781	268	2.649	390	(s)	384	(s)	202	0.781	266	2.649	301	0.11
326	0.014	386	(s)	306	0.131	383	0.001	324	0.014	385	(s)	304	0.131	383	0.001	215	1.33
301	0.022	308	0.105	361	0.024	356	0.203	298	0.022	306	0.105	360	0.024	355	0.203	316	0.01
253	0.051	376	0.010	280	[30]0.194	379	[30]0.040	250	0.051	374	0.010	278	[30]0.194	379	[30]0.040	—	NA
352	0.007	360	0.026	305	0.133	334	0.505	350	0.007	358	0.026	303	0.133	332	0.505	97	10.66
336	0.011	350	0.034	329	0.080	355	0.222	334	0.011	348	0.034	328	0.080	354	0.222	260	0.62
371	0.002	364	0.020	374	0.012	340	0.417	370	0.002	362	0.020	374	0.012	339	0.417	219	1.25
380	0.001	375	0.011	375	0.012	346	0.350	379	0.001	373	0.011	375	0.012	345	0.350	—	NA
384	0.001	368	0.018	382	[30]0.004	376	[30]0.060	383	0.001	366	0.018	383	[30]0.004	376	[30]0.060	—	—
368	0.004	367	0.019	377	0.009	377	0.050	367	0.004	365	0.019	377	0.009	377	0.050	—	—
316	0.016	351	0.034	322	0.105	366	0.105	313	0.016	349	0.034	320	0.105	365	0.105	279	0.38
365	0.004	381	0.003	355	0.031	372	0.090	363	0.004	380	0.003	354	0.031	371	0.090	262	0.61
—	—	380	0.004	—	—	375	0.072	—	—	379	0.004	—	—	374	0.072	—	NA
354	0.007	361	0.026	337	0.066	351	0.294	352	0.007	359	0.026	336	0.066	350	0.294	—	—
388	(s)	352	0.034	386	0.001	369	0.091	387	(s)	350	0.034	386	0.001	368	0.091	211	1.50
373	0.002	319	0.089	380	0.008	370	0.090	372	0.002	317	0.089	380	0.008	369	0.090	—	—
386	0.001	—	—	379	0.009	378	0.049	385	0.001	—	—	379	0.009	378	0.049	—	—
361	0.006	383	0.002	—	—	—	—	359	0.006	382	0.002	—	—	—	—	121	5.85
	3,835.4		13,018.5		35,445.2		182,083.1		2,386.5		10,082.3		22,444.9		130,865.9		10,993.35

after fiscal yearend. 70. Fiscal yearend Nov. 30. 71. Subsidiary of CBI Industries Inc. 72. Formerly Unit Drilling & Exploration Co. 73. Income from continuing operations before income taxes. 74. Subsidiary of National Distillers & Chemical Corp. 75. Reserves and production are for Oct. 1985-Oct. 1986. 76. Energy segment includes oil, gas and coal operations. 77. Financial data is pro forma to reflect merger with Clinton America Corp. 78. Doesn't include dry hole costs. 79. Formerly Drillers Inc. 80. Subsidiary of Gulf Resources & Chemical Corp. 81. Subsidiary of Public Service Co. of Colorado. 82. Subsidiary of Washington Energy Corp. 83. Subsidiary of Brooklyn Union Gas Co. 84. Subsidiary of Penn Virginia Corp. 85. Pyro Energy owns 67% of company's stock. 86. Subsidiary of Pacificorp. 87. Kelley Oil owns 2% of partnership units. 88. Figures are for period from inception on Jan. 23, 1986 through Dec. 31, 1986. 89. U.S. subsidiary of Canada Northwest Energy Ltd. 90. Saxon Oil owns 30% of partnership units. 91. M.A. Hanna Co. owns 99% of stock but company operates independently. 92. Formerly listed under parent company MDU Resources Group Inc. 93. U.S. subsidiary of Coho Resources Ltd. 94. Thirteen months ended Jan. 31, 1987. 95. Subsidiary of Northwest Natural Gas Co. 96. Fiscal yearend Apr. 30. 97. Subsidiary of Energen Corp. 98. Company emerged from Chap. 11 on Feb. 28, 1987 after fiscal yearend. 99. Fiscal yearend Feb. 28, 1986. 100. Subsidiary of Sparton Corp. 101. Since fiscal yearend company has agreed to merge with McFarland Energy. 102. Since fiscal yearend company has sold all oil and gas properties. 103. Six months. 104. Fiscal yearend July 31. 105. Fiscal yearend Feb. 28, 1987. 106. Company's principal business is management of CoVest Energy Partners of which it owns 10% of partnership units. 107. Fiscal yearend Oct. 31. 108. Fiscal year covers 15 months ended Mar. 31, 1987. Company has agreed to merge with Oxford Consolidated. 109. Operating income before interest, income tax and write down of assets. 110. U.S. subsidiary of Silverton Resources Ltd. 111. Since fiscal yearend has agreed to merge with Patrick Petroleum. 112. Nine months. 113. Since fiscal yearend has agreed to merge with Lomak Petroleum. 114. Since fiscal yearend company has made agreement to acquire: Kee Exploration, Diablo Oil, Sierra Exploration, Noarko Resources, and Wichita Industries. 115. Formerly listed under parent company, Wicor Inc. 116. Operating income before taxes. 117. Gross before deduction of royalties and taxes. 118. Since fiscal yearend has agreed to merger with Western Energy Development Co. 119. Subsidiary of Twin Richfield Oil Ltd. 120. Fourteen months. 121. Fiscal yearend Jan. 31, 1986. 122. Since fiscal yearend company has agreed to merger with Tipperary. 123. Four months. 124. Since fiscal yearend has agreed to merger with Fountain Oil & Gas. 125. Hadson owns 85% of company's stock. 126. Formed through merger of Nova Petroleum and Power Resources. 127. Company has gas reserves but they have not been estimated. 128. U.S. subsidiary of Tiber Energy Corp. 129. Formerly Universal Energy. 130. A development stage company.

The OGJ400 Company Index

Rank by total assets	Company name	Headquarters city
223	Adams Resources & Energy Inc.	Houston
81	Adobe Resources Corp.	New York
158	Alamco Inc.	Clarksburg, WV
337	Albion International Resources Inc.	Laguna Beach, CA
176	Alexander Energy Corp.	Oklahoma City
104	Allegheny & Western Energy Corp.	Charleston, WV
276	Alta Energy Corp.	Midland, TX
277	Altex Industries Inc.	Denver
382	Amacan Resources Corp.	Salt Lake City
163	AMAX Inc. (Oil & Gas Operators)	Greenwich, CT
398	Amber Resources Co.	Denver
262	Amcole Energy Corp.	Fort Worth
20	Amerada Hess	New York
141	American Exploration Co.	Houston
181	American Oil & Gas Corp.	Houston
39	American Petrofina Inc.	Dallas
178	American Quasar Petroleum Co.	Fort Worth
87	American Royalty Trust	Houston
6	Amoco Corp.	Chicago
48	Anadarko Petroleum Corp.	Houston
65	Apache Corp.	Denver
68	Apache Petroleum Co. L.P.	Denver
327	Appalachian Oil & Gas Co. Inc.	Chatanooga, TN
247	Arapaho Petroleum Inc.	Englewood, CO
308	Arch Petroleum Inc.	Fort Worth
7	ARCO (Atlantic Richfield Corp.)	Los Angeles
173	Argo Petroleum Corp.	Santa Monica, CA
32	Arkla Inc.	Shreveport, LA
134	Asamera Inc.	Calgary, Alberta
23	Ashland Oil Inc.	Ashland, KY
316	Aspen Exploration Corp.	Denver
119	Avalon Corp.	New York
225	Barrett Resources Corp.	Denver
209	Baruch-Foster Corp.	Dallas
257	Basic Earth Science Systems Inc.	Englewood, CO
279	Bayou Resources Inc.	Houston
159	Beard Oil Co.	Oklahoma City
253	Belcor Inc.	Irvine, CA
211	Belden & Blake Energy Co.	North Canton, OH
233	Bellwether Exploration Co.	Denver
365	Bengal Oil & Gas Corp.	London, U.K.
44	BHP Petroleum (Americas), Inc.	Houston
347	Big Piney Oil & Gas Co.	Salt Lake City
287	Black Gold Energy Resources Inc.	Parker, CO
179	Bogert Oil Co.	Oklahoma City
360	Bolyard Oil & Gas Ltd.	Denver
383	Bowtex Energy (Canada) Corp.	Calgary, Alberta
384	Bristol Oil & Gas Inc.	Midland, TX
213	Brock Exploration Corp.	New Orleans
392	Bronco Oil & Gas Co.	Denver
265	Burkhart Petroleum Corp.	Tulsa
296	Burton/Hawks Inc.	Casper, WY
45	Cabot Corp.	Waltham, MA
154	Callon Petroleum Co.	Natchez, MS
187	Calumet Industries Inc.	Chicago
363	Carmel Energy Inc.	Houston
281	Castle Energy Corp.	Blue Bell, PA
339	Castle Royalty L.P.	Kansas City, MO
40	Celeron Corp.	Santa Barbara, CA
124	Cenergy Corp.	Dallas
69	CENEX (Farmer's Union Central Exchange)	St. Paul
322	Chaparral Resources Inc.	Denver
182	Chapman Energy Inc.	Dallas
4	Chevron Corp.	San Francisco
364	Cheyenne Resources Inc.	Cheyenne, WY
144	ChieRain Development Co. Ltd.	Edmonton, AB
373	Circle Seven Oil & Gas Inc.	Jacksboro, TX
17	Coastal Corp.	Houston
250	Cobb Resources Corp.	Albuquerque
207	Coho Resources Inc.	Calgary, Alberta
18	Columbia Gas System Inc.	Wilmington, DE
314	Columbine Exploration Corp.	Denver
367	Comanche Oil Exploration Inc.	Denver
260	Com-Tek Resources Inc.	Denver
15	Conoco Corp.	Houston
137	Conquest Exploration Co.	Houston
22	Consolidated Natural Gas Co.	Pittsburgh
138	Consolidated Oil & Gas Inc.	Denver
246	ConVest Energy Corp.	Houston
186	ConVest Energy Partners Ltd.	Houston
269	Coseka Resources Ltd.	Calgary, Alberta
284	Credo Petroleum Corp.	Denver
315	Crescent Oil & Gas Corp.	Denver
396	Croff Oil Co.	Denver
86	Crown Central Petroleum Corp.	Baltimore
390	Crown Energy Corp	Salt Lake City
338	Crown Resource Corp.	Denver
136	Crystal Oil Co.	Shreveport, LA
79	CSX Oil & Gas Corp.	Houston
298	Dallas Oil & Minerals Inc.	Fort Worth
109	Damson Oil Corp.	New York
97	DeKalb Energy Cos.	Denver
189	Deminex U.S. Oil Co.	Dallas
177	Devon Resource Investors	Oklahoma City
166	DI Industries Inc.	Houston
388	Diablo Oil Co.	Denver
24	Diamond Shamrock Corp.	Dallas
84	Diamond Shamrock Offshore Partners L.P.	Dallas
255	Dietrich Resources Corp.	Denver
64	Diversified Energies Inc.	Minneapolis
245	Dorchester Hugoton Ltd.	Dallas
329	Double Eagle Petroleum & Mining Co.	Casper, WY
354	Eagle Exploration Co.	Denver
359	EMC Energies Inc.	Casper, WY
243	Energy Assets International Corp.	New York
304	Energy Capital Development Corp.	Rosslyn, VA
239	Energy Management Corp.	Denver
325	Energy Resources of North Dakota Inc.	Williston, ND
193	Energy Ventures Inc.	New York
188	Enex Resources Corp.	Kingwood, TX
16	Enron Corp.	Houston
27	Ensarch Corp.	Dallas
53	Ensarch Exploration Partners Ltd.	Dallas
130	Ensource Inc.	Houston
157	Entex Energy Development Ltd.	Houston
197	Equitable Petroleum Corp.	New York
54	Equitable Resources Inc.	Pittsburgh
153	Equity Oil Co.	Salt Lake City
156	Ethyl Corp. (Energy Segment)	Richmond, VA
236	Evergreen Resources Inc.	Denver
320	Exploration Co.	San Antonio
148	Exploration Co. of Louisiana Inc.	Lafayette, LA
1	Exxon Corp.	New York
283	Falcon Oil & Gas Co. Inc.	Odessa, TX
194	Federated Natural Resources Corp.	Traverse City, MI
114	Felmont Oil Corp.	Stamford, CT
206	Fidelity Oil Co.	Bismark, ND
91	First Mississippi Corp.	Jackson, MS
395	Five Star Energy Corp.	Calabasas, CA
142	Flag-Redfern Oil Co.	Midland, TX
78	Forest Oil Corp.	Bradford, PA
288	Fountain Oil & Gas Inc.	Denver
89	FPCO Oil & Gas Co.	Denver
62	Freeport-McMoRan Energy Partners Ltd.	New Orleans
31	Freeport-McMoRan Inc.	New Orleans
147	Freeport-McMoRan Oil & Gas Royalty Trust	Houston
168	Fuel Resources Development Co.	Denver
171	Fuel Resources Inc.	Brooklyn, NY
162	Galaxy Oil Co.	Wichita Falls, TX
244	Geodyne Resources Inc.	Tulsa
271	GeoResources Inc.	Williston, ND
291	Gerber Energy International Inc.	Denver
47	Global Marine Inc.	Houston
129	Global Natural Resources Inc.	Houston
264	Golden Oil Co.	Denver
366	Golden Triangle Royalty & Oil Inc.	Cisco, TX
55	Grace Natural Resources Group	Dallas
143	Graham-McCormick Oil & Gas Partnership	Covington, LA
219	Great American Partners	San Diego
290	Great Eastern Energy & Development Corp.	Englewood, CO
301	Greenwood Resources Inc.	Englewood, CO
111	Hadson Corp.	Oklahoma City
61	Hamilton Oil Corp.	Denver
121	Harken Oil & Gas Inc.	Bedford, TX
74	Helmerich & Payne Inc.	Tulsa
302	Henry Energy Corp.	Arlington, TX
216	Hershey Oil Corp.	Pasadena, CA
375	Hipoint Investments Ltd.	Oklahoma City
102	Home Petroleum Corp.	Denver
258	Home-Stake Oil & Gas Co.	Tulsa
235	Home-Stake Royalty Corp.	Tulsa
270	Houston Oil Royalty Trust	Houston
151	Houston Oil Trust	Houston
397	Houston Oil & Energy Inc.	Cisco, TX
113	Howell Corp.	Houston
355	Hubco Exploration Inc.	New Orleans
376	Hughes Texas Petroleum Corp.	Hattiesburg, MS
345	Impact Energy Inc.	Denver
400	Imperial Energy Corp.	Denver
139	Integrated Drilling & Exploration Inc.	Tulsa
275	Intercontinental Energy Corp.	Englewood, CO
350	International Royalty & Oil Co.	Fort Worth
328	Intramerican Oil & Minerals Inc.	Dallas
266	Jackson Exploration Inc.	Dallas
378	J.M. Resources Inc.	Dallas
110	Kaiser Energy Inc.	Oakland, CA
118	Kaneb Energy Partners Ltd.	Sugar Land, TX
83	Kaneb Services Inc.	Sugar Land, TX
389	Katy Energy Corp.	Riveria, FL
393	Kee Exploration Inc.	Denver
333	Keldon Oil Co.	Bismark, ND
295	Kelley Oil Corp.	Houston
198	Kelley Oil & Gas Partners Ltd.	Houston
203	KenCope Energy Companies	San Antonio
28	Kerr-McGee Corp.	Oklahoma City
226	Kimbark Oil & Gas Co.	Denver
120	Kirby Exploration Co. Inc.	Houston
299	KRM Petroleum Corp.	Denver
161	Leader Development Corp.	Columbus, OH
192	LL&E Royalty Trust	Houston
220	Lomak Petroleum Inc.	Hartville, OH
42	Louisiana Land & Exploration Co.	New Orleans
349	Love Oil Co. Inc.	Denver
317	Lyric Energy Inc.	Amarillo, TX
196	MacMillan Ring Free Oil Co. Inc.	New York
224	Magic Circle Energy Corp.	Oklahoma City
174	May Energy Partners Ltd.	Dallas
149	May Petroleum Inc.	Dallas
172	Maynard Oil Co.	Dallas
202	McFarland Energy Inc.	Sante Fe Springs, CA

The OGJ400 Company Index (continued)

Rank by total assets	Company name	Headquarters city
135	MCO Resources Inc.	Houston
372	Melton Drilling & Exploration Co.	Midland, TX
30	Meridian Oil Inc.	Fort Worth
29	Mesa Limited Partnership	Amarillo, TX
230	Michigan Oil Co.	Jackson, MI
204	Midland SouthWest Corp.	Midland, TX
353	Midwest Exploration Inc.	Oklahoma City
326	Mineral Development Inc.	Dallas
33	Mitchell Energy & Development Co.	The Woodlands, TX
2	Mobil Corp.	New York
294	Monogram Oil & Gas Inc.	North Canton, OH
38	Montana Power Co.	Butte, MT
75	Moore McCormack Energy Inc.	Dallas
205	MSR Exploration Ltd.	Cut Bank, MT
35	Murphy Oil Corp.	El Dorado, AR
280	Mustang Cos. Inc.	Great Bend, KS
278	Nahama & Weagant Energy Co.	Bakersfield, CA
92	National Cooperative Refinery Association	McPherson, KS
50	National Fuel Gas Co.	New York
191	Nerco Oil & Gas Inc.	Vancouver, WA
248	Newhall Resources	Valencia, CA
34	Nicor Inc.	Naperville, IL
385	Noarko Resources Inc.	Denver
71	Noble Affiliates Inc.	Ardmore, OK
128	Noble Drilling Corp.	Tulsa
103	NOMECO (Northern Michigan Exploration Co.)	Jackson, MI
107	Norcen Energy Resources Ltd.	Calgary, Alberta
311	Normandy Oil & Gas Co. Inc.	Fort Worth
240	Norris Oil Co.	Beverly Hills, CA
332	Nova Natural Resources Corp.	Salt Lake City
305	NP Energy Corp.	Los Angeles
94	NRM Energy Co. L.P.	Dallas
217	Nugget Oil Corp.	Bloomington, MN
99	NUI Corp.	Bridgewater, NJ
229	Oakridge Energy Inc.	Wichita Falls, TX
9	Occidental Petroleum Corp.	Los Angeles
51	Ocean Drilling & Exploration Co.	New Orleans
374	Oil City Petroleum Inc.	Tulsa
155	OXC Limited Partnership	Dallas
56	Oneok Inc.	Tulsa
212	Oregon Natural Gas Development Corp.	Portland, OR
386	ORS Corp.	Tulsa
306	Oxford Consolidated Inc.	Denver
184	Oxoco Inc.	Houston
90	Pacific Lighting Oil & Gas Co.	Los Angeles
303	Paloma Petroleum Ltd.	Calgary, Alberta
391	Pan Energy Resources Inc.	West Chester, PA
360	Pangea Petroleum Co.	Torrance, CA
268	Panhandle Royalty Co.	Oklahoma City
324	Pantepec International Inc.	Woodbridge, CT
300	Parallel Petroleum Corp.	Midland, TX
116	Park-Ohio Industries Inc.	Cleveland
267	Partners Oil Co.	Houston
335	Pathfinder Petroleum Corp.	Oklahoma City
169	Patrick Petroleum Co.	Jackson, MI
150	Pauley Petroleum Inc.	Los Angeles
108	Pelto Oil Co.	Houston
167	Pend Oreille Oil & Gas Co.	Houston
292	Peninsula Resources Corp.	Corpus Christi, TX
323	Penn Pacific Corp.	Santa Ana, CA
183	Penn Virginia Resources Corp.	Duffield, VA
25	Pennzoil Co.	Houston
254	Permian Basin Royalty Trust	Fort Worth
341	Petrol Industries Inc.	Shreveport, LA
199	Petroleum Development Corp.	Bridgeport, WV
195	Petroleum Investments Ltd.	Oklahoma City
273	Petroleum Reserve Corp.	Tulsa
272	Petromark Resources Co.	Tulsa
232	Petrominerals Corp.	Stanton, CA
274	Petrotech Inc.	Englewood, CO
11	Phillips Petroleum Co.	Bartlesville, OK
351	Pioneer Oil & Gas Corp.	Midvale, UT
190	Plains Petroleum Co.	Lakewood, CO
165	Plains Resources Inc.	Oklahoma City
318	Plano Petroleum Corp.	Plano, TX
72	Pogo Producing Co.	Houston
106	Prairie Producing Co.	Houston
231	Premier Resources Ltd.	Denver
164	Presidio Oil Co.	Englewood, CO
285	Prima Energy Corp.	Denver
46	Primark Corp.	McLean, VA
85	Primary Fuels Inc.	Houston
261	Pyramid Oil Co.	Bakersfield, CA
112	Pyro Energy Corp.	Evansville, IN
259	QED Exploration Inc.	Denver
200	Quadra Oil & Gas Inc.	Denver
70	Quaker State Corp.	Oil City, PA
336	Questa Oil & Gas Co.	Littleton, CO
52	Questar Corp.	Salt Lake City
101	Quinoco Cos.	Denver
115	Ram Industries Inc.	Dallas
321	Ranger Oil Ltd.	Calgary, Alberta
214	Ratex Resources Inc.	Oklahoma City
63	Reading & Bates Corp.	Tulsa
342	Reef Energy Corp.	Traverse City, MI
309	Republic Resources Corp.	Oklahoma City
348	Reserve Exploration Co.	Tulsa
215	Resource Exploration Inc.	Akron, OH
319	Roberts Oil & Gas Inc.	Houston
310	Roseland Oil & Gas Co. Inc.	Tyler, TX
58	Rowan Cos. Inc.	Houston
234	Royal Resources Corp.	Denver
93	Sabine Corp.	Dallas
221	Sabine Royalty Trust	Dallas
241	Sage Drilling Co. Inc.	Wichita, KS
126	Sage Energy Co.	San Antonio
180	Samson Energy Co.	Tulsa
133	San Juan Basin Royalty Trust	Fort Worth
60	Santa Fe Energy Co.	Houston
88	Santa Fe Energy Partners L.P.	Houston
228	Saxon Oil Co.	Dallas
201	Saxon Oil Development Partners L.P.	Dallas
394	Score Exploration Corp.	Casper, WY
95	Seagull Energy Corp.	Houston
237	Seahawk Oil International Inc.	Newport Beach, CA
331	Seaze Energy Corp.	Jackson, MS
361	Sharon Energy Ltd.	Englewood, CO
399	Shaw Resources Inc.	Riverside, CA
358	Sheffield Exploration Co. Inc.	Denver
5	Shell Oil Co.	Houston
330	Sierra Exploration Co.	Denver
125	Snyder Oil Partners L.P.	Fort Worth
26	Sonat Inc.	Birmingham, AL
362	South Texas Drilling & Exploration Inc.	San Antonio
312	Southern Mineral Corp.	Houston
82	Southern Union Co.	Dallas
98	Southwestern Energy Co.	Fayetteville, AR
146	SPG Exploration Corp.	San Antonio
10	Standard Oil Co.	Cleveland
117	Statex Petroleum Inc.	San Diego
377	Sterling Oil of Oklahoma Inc.	Tulsa
282	Strata Corp.	Columbus, OH
252	Striker Petroleum Corp.	Englewood, CO
242	Summit Energy Inc.	Dallas
13	Sun Co.	Radnor, PA
344	Sunbelt Exploration Inc.	Fort Worth
80	Sunshine Mining Co.	Dallas
222	Swift Energy Co.	Houston
218	Taurus Exploration Inc.	Birmingham, AL
346	Taurus Petroleum Inc.	Denver
8	Tenneco Inc.	Houston
73	Tesoro Petroleum Corp.	San Antonio
3	Texaco Inc.	White Plains, NY
123	Texas American Energy Corp.	Midland, TX
19	Texas Eastern Corp.	Houston
105	Texas International Co.	Oklahoma City
387	Texas Vanguard Oil Co.	Austin, TX
251	Texon Energy Corp.	Houston
100	TGX Corp.	Houston
170	Thermal Exploration Co.	Seattle
249	Thor Energy Resources Inc.	Tyler, TX
379	Tiber Resources Inc.	Calgary, Alberta
76	Tidewater Inc.	New Orleans
185	Tipperary Corp.	Midland, TX
352	Toklan Oil Corp.	Tulsa
145	Tom Brown Inc.	Midland, TX
77	Tosco Corp.	Santa Monica, CA
57	Total Petroleum (North America) Ltd.	Denver
369	TPEX Exploration Inc.	Golden, CO
21	Transco Energy Co.	Houston
49	Transco Exploration Partners Ltd.	Houston
152	Tribune/Swab-Fox Cos. Inc.	Tulsa
227	Trinity Resources Ltd.	Houston
96	Triton Energy Corp.	Dallas
370	Tri-Valley Corp.	Bakersfield, CA
210	Tucker Drilling Co. Inc.	San Angelo, TX
307	Twin Richfield Oils Inc.	Calgary, Alberta
313	Tyrex Oil Co.	Casper, WY
66	Unimar Corp.	Tarrytown, NY
43	Union Exploration Partners Ltd.	Los Angeles
37	Union Pacific Resources Co.	Fort Worth
36	Union Texas Petroleum Holdings Inc.	Houston
140	Unit Corp.	Tulsa
380	United Western Energy Corp.	Oklahoma City
132	Universal Resources Corp.	Dallas
14	Unocal Corp.	Los Angeles
263	Usenco Inc.	Fort Worth
12	USX Corp. (Oil & Gas Segment)	Pittsburgh
41	Valero Energy Corp.	San Antonio
293	Valex Petroleum Inc.	Denver
238	Vermilion Bay Land Co.	Lafayette, LA
122	Wainoco Oil Corp.	Houston
175	Walker Energy Partners	Houston
289	Wepco Energy Co.	Cleveland
256	Western Energy Development Co. Inc.	Denver
340	Western Energy Resources Inc.	Mission Viejo, CA
357	Western Natural Gas Co.	Dallas
297	Wexco of Delaware Inc.	Milwaukee
286	Whiting Petroleum Corp.	Denver
334	Wichita Industries Inc.	Denver
356	Wicklund Petroleum Corp.	Bloomfield Hills, MI
343	Willard Pease Oil & Gas Co.	Grand Junction, CO
160	Wilshire Oil Co. of Texas	Jersey City, NJ
127	Wintershall Corp.	Englewood, CO
131	Wiser Oil Co.	Sistersville, WV
371	Wyoming Oil & Minerals Inc.	Casper, WY
67	Yankee Cos. Inc.	Cohasset, MA
381	Yellowstone Resources Inc.	Denver
59	Zapata Corp.	Houston
208	ZIM Energy Corp.	Houston

International Active Rig Count

Region	1980	1981	1982	1983	1984	1985 Land	1985 Off.	1985 Total	1986 Land	1986 Off.	1986 Total	1987 Land	1987 Off.	1987 Total
NORTH AMERICA														
Canada	401	263	200	201	259	302	9	311	174	4	178	179	2	181
United States*	2,910	3,969	3,117	2,229	2,429	1,722	254	1,976	847	123	970	816	120	936
Subtotal	**3,311**	**4,232**	**3,317**	**2,430**	**2,688**	**2,024**	**263**	**2,287**	**1,021**	**127**	**1,148**	**995**	**122**	**1,117**
LATIN AMERICA														
Argentina	76	70	67	73	82	81	0	81	47	0	47	60	1	61
Barbados	0	1	1	1	1	1	0	1	1	0	1	0	0	0
Bolivia	4	11	11	8	6	5	0	5	4	0	4	6	0	6
Brazil	72	81	94	83	70	46	30	76	46	31	77	35	25	60
Chile	7	7	7	6	6	3	3	6	3	3	6	4	3	7
Colombia	14	22	23	18	16	21	0	21	17	0	17	14	0	14
Costa Rica	0	0	0	1	1	0	0	0	0	0	0	1	0	1
Ecuador	3	4	6	5	4	2	0	2	3	0	3	3	0	3
Guatemala	4	6	5	2	1	0	0	0	0	0	0	1	0	1
Mexico	215	218	202	187	196	163	33	196	132	31	163	112	31	143
Paraguay	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Peru	21	24	23	16	17	8	4	12	9	4	13	11	4	15
Trinidad	13	14	13	10	9	7	3	10	7	4	11	5	4	9
Venezuela	52	63	69	41	30	23	10	33	16	13	29	9	9	18
Subtotal	**481**	**521**	**522**	**451**	**439**	**360**	**83**	**443**	**285**	**86**	**371**	**261**	**77**	**338**
FAR EAST														
Bangladesh	3	5	5	2	4	5	0	5	5	0	5	5	0	5
Brunei	8	7	10	10	9	1	6	7	1	4	5	0	3	3
Burma	26	30	32	36	33	32	1	33	32	1	33	29	0	29
China-offshore	12	9	10	10	9	0	14	14	0	7	7	0	4	4
India	43	44	50	56	57	47	15	62	55	15	70	94	22	116
Indonesia	77	86	92	88	82	56	24	80	42	20	62	25	12	37
Japan	16	16	22	20	18	12	4	16	12	3	15	10	0	10
Malaysia	12	12	13	10	9	0	8	8	0	8	8	0	8	8
North Korea	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Pakistan	14	15	17	17	17	18	0	18	17	0	17	14	0	14
Philippines	12	13	14	8	3	2	0	2	1	0	1	2	0	2
Taiwan	12	11	4	5	6	5	2	7	5	2	7	2	2	4
Thailand	5	7	8	13	11	4	5	9	3	1	4	3	3	6
Viet Nam	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	**242**	**255**	**277**	**275**	**258**	**182**	**79**	**261**	**173**	**61**	**234**	**184**	**54**	**238**
AFRICA														
Algeria	111	91	81	54	27	35	0	35	41	0	41	40	0	40
Angola	5	5	11	12	7	3	8	11	0	7	7	1	9	10
Benin	0	0	0	0	1	0	1	1	0	0	0	0	0	0
Cameroon	6	7	7	5	4	0	2	2	0	1	1	0	0	0
Chad	1	1	1	0	0	1	0	1	1	0	1	0	0	0
Congo	4	7	6	4	3	0	3	3	0	2	2	0	3	3
Gabon	8	13	12	7	6	1	6	7	1	2	3	0	3	3
Guinea Republic	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Ivory Coast	3	5	5	2	2	0	1	1	0	0	0	0	0	0
Kenya	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Liberia	0	0	0	0	0	0	1	1	0	0	0	0	0	0
Libya	41	33	31	24	26	28	2	30	20	0	20	12	0	12
Madagascar	0	0	0	0	0	1	0	1	1	0	1	0	0	0
Morocco	2	5	5	6	4	2	1	3	3	0	3	2	0	2
Niger	5	5	3	0	0	0	0	0	0	0	0	0	0	0
Nigeria	20	23	27	17	11	8	2	10	7	3	10	6	5	11
Senegal	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Somalia	0	0	0	0	1	1	1	2	0	0	0	0	0	0
South Africa	2	2	2	2	2	1	2	3	0	3	3	0	3	3
Sudan	2	3	2	4	2	1	0	1	1	0	1	0	0	0
Tanzania	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Tunisia	8	11	11	7	6	3	1	4	2	1	3	3	1	4
Zaire	1	2	2	2	2	2	0	2	1	0	1	1	0	1
Subtotal	**219**	**213**	**209**	**147**	**105**	**87**	**31**	**118**	**78**	**19**	**97**	**66**	**24**	**90**
EUROPE														
Austria	8	9	9	9	7	7	0	7	6	0	6	4	0	4
Belgium	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark	3	2	2	5	3	1	3	4	0	3	3	0	3	3
France	13	21	22	17	20	22	0	22	15	0	15	8	0	8
Germany, Fed. Rep.	22	26	31	25	19	20	0	20	19	0	19	12	0	12
Greece	3	6	5	3	4	1	0	1	0	0	0	2	0	2
Holland	17	17	21	17	18	7	17	24	4	11	15	3	7	10

International active rig count—continued

Region	1980	1981	1982	1983	1984	1985 Land	1985 Off.	1985 Total	1986 Land	1986 Off.	1986 Total	1987 Land	1987 Off.	1987 Total
Ireland	1	0	0	1	2	0	2	2	0	1	1	0	1	1
Italy	19	32	38	26	26	31	9	40	24	9	33	20	6	26
Norway	11	12	13	10	10	0	13	13	0	12	12	0	12	12
Portugal	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Spain	10	11	12	8	9	6	4	10	4	3	7	2	0	2
Switzerland	1	1	1	0	0	0	0	0	0	0	0	0	0	0
United Kingdom	48	58	58	42	60	7	56	63	7	36	43	4	40	44
Yugoslavia	22	22	24	21	25	25	2	27	27	3	30	28	3	31
Subtotal	**179**	**218**	**237**	**185**	**203**	**127**	**106**	**233**	**106**	**78**	**184**	**83**	**72**	**155**
MIDDLE EAST														
Abu Dhabi	23	31	41	35	29	9	12	21	8	7	15	3	6	9
Bahrain	1	1	1	1	0	1	0	1	1	0	1	1	0	1
Dubai	3	2	3	7	7	1	4	5	1	2	3	0	2	2
Egypt	26	27	36	35	36	16	21	37	17	16	33	14	9	23
Iran	0	0	3	13	20	18	2	20	16	2	18	18	0	18
Iraq	39	14	11	23	19	28	0	28	21	0	21	10	0	10
Jordan	0	0	0	3	3	2	0	2	2	0	2	2	0	2
Kuwait	3	3	4	5	5	6	0	6	6	0	6	6	0	6
North Yemen	0	0	0	0	0	1	0	1	4	0	4	4	0	4
Oman	8	10	12	11	12	13	0	13	12	1	13	10	0	10
Qatar	8	7	5	3	2	1	2	3	1	0	1	1	0	1
Ra's al Khaymah	1	1	2	1	0	0	0	0	0	0	0	0	0	0
Saudi Arabia	25	29	29	26	16	6	5	11	5	1	6	4	1	5
Sharjah	1	2	3	1	0	0	0	0	0	0	0	0	0	0
South Yemen	0	0	0	0	1	2	0	2	1	0	1	0	0	0
Syria	15	16	15	15	23	26	0	26	27	0	27	22	0	22
Turkey	24	26	34	26	24	25	0	25	27	0	27	26	0	26
Umm al Qawain	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Subtotal	**177**	**170**	**200**	**206**	**197**	**155**	**46**	**201**	**149**	**29**	**178**	**121**	**18**	**139**
SOUTH PACIFIC														
Australia	15	23	33	25	34	22	9	31	9	6	15	13	3	16
New Zealand	2	3	1	2	2	3	1	4	3	1	4	2	1	3
Papua New Guinea	1	0	0	1	1	2	0	2	1	0	1	2	0	2
Subtotal	**18**	**26**	**34**	**28**	**37**	**27**	**10**	**37**	**13**	**7**	**20**	**17**	**4**	**21**
Total	**4,627**	**5,635**	**4,796**	**3,722**	**3,927**	**2,962**	**618**	**3,580**	**1,825**	**407**	**2,232**	**1,727**	**371**	**2,098**

* U.S. offshore includes inland water rigs: 48 in 1985, 23 in 1986, and 24 in 1987. Source: Baker Hughes Inc.

International seismic crew count

	1982 Land	1982 Marine	1982 Total	1983 Land	1983 Marine	1983 Total	1984 Land	1984 Marine	1984 Total
	(Average crews operating)								
United States	512	57	569	430	49	479	441	47	488
Canada	63	5	68	72	7	79	82	5	87
Mexico	29	1	30	28	1	29	32	0	32
Central & South America	98	7	105	81	5	86	79	9	88
Europe	69	31	100	71	26	97	81	35	116
Middle East	43	3	46	33	1	34	36	2	38
Africa	70	6	76	60	10	70	53	6	59
Far East	103	16	119	95	15	110	85	12	97
Total	**987**	**126**	**1,113**	**870**	**114**	**984**	**889**	**116**	**1,005**

	1985 Land	1985 Marine	1985 Total	1986 Land	1986 Marine	1986 Total	1987* Land	1987* Marine	1987* Total
	(Average crews operating)								
United States	319	45	364	161	22	183	140	20	160
Canada	86	4	90	53	1	54	59	1	60
Mexico	32	0	32	29	0	29	24	0	24
Central & South America	64	8	72	48	5	53	43	4	47
Europe	78	35	113	65	26	91	51	23	74
Middle East	40	2	42	33	4	37	36	4	40
Africa	55	6	61	44	4	48	38	4	42
Far East	92	9	101	74	9	83	100	10	110
Total	**766**	**109**	**875**	**507**	**71**	**578**	**491**	**66**	**557**

*First half.
Source: Society of Exploration Geophysicists

How Nymex's energy volume has grown

Contract	Date introduced	Number of contracts traded 1987	1986	1985	1984
FUTURES					
Crude oil	3/30/83	14,581,614	8,313,529	3,980,861	1,840,342
Heating oil	11/14/78	4,293,395	3,275,044	2,207,733	2,091,546
Gasoline*	12/3/84	2,056,238	1,269,085	799,783	656,366
Propane	8/21/87	15,312	—	—	—
Total futures		**20,946,559**	**12,857,658**	**6,988,377**	**4,588,245**
OPTIONS					
Crude	11/14/86	3,117,037	135,266	—	—
Heating oil	6/26/87	143,605	—	—	—
Total options		**3,260,642**	**135,266**	**—**	**—**

*Includes both leaded gasoline and unleaded gasoline futures. Leaded gasoline futures contract was introduced 10/5/81 and terminated 10/31/86.

Speculators must assume the risks that hedgers seek to avoid. Speculators are normally thought of as individuals or organizations with no involvement in the oil industry. But industry firms also speculate in the futures market. They may also be hedging production revenue or refining feedstock costs at the same time.

A true speculator tries to anticipate the future price of a commodity; an arbitrager doesn't try to guess which way the price will go but watches the differential between the cash and futures price, or between various grades in the cash market.

When he thinks these relationships are out of line, the arbitrager buys in one market and sells in another to try to fix a trading profit.

Hedging is a key industry strategy

A hedge consists of taking a position in the futures market that is opposite the position held in the physical commodity. Two key reasons for hedging are to protect the value of inventory or fix the cost of purchases.

For example, an independent producer with oil reserves is considered "long" in the cash, or physical, market. By selling crude oil futures—the opposite position to the position in the cash market—he can fix the selling price in advance of production.

For most companies in the petroleum industry, hedging is the most important function of the market. Hedging offers a way to reduce price risk. By fixing prices and margins in advance, the hedger limits the potential for loss.

Hedging also, however, limits the chance for gains that might result from changes in the price of the physical commodity.

A hedge works because the cash and futures prices move in tandem. In the independent producer example, if the price of crude declines, the loss the independent suffers when crude is sold is offset by the gain when futures contracts are bought back at the lower cost to cover the contracts sold earlier.

If the price rises, then the producer gets more for the crude sold. But he must cover the futures contracts he sold by buying contracts at a higher price.

Regardless of what happens to crude prices after the hedge is in place, the producer's revenue is already fixed. If a contract is sold for more than a contract cost to buy, a gain is realized. It doesn't matter which was done first—buy or sell.

A hedge might also be applied to a crude cargo enroute to the U.S. Gulf Coast. If the crude has been purchased and is to be sold at the spot price at the time of delivery, there is a risk that prices will fall while the cargo is in transit.

By selling futures contracts to fix a resale margin, the trader could minimize that risk.

If spot prices increase while the cargo is in transit, then the gain would be made on the sale of the crude cargo, and loss would occur on the futures contracts.

A crude oil gatherer can guarantee producers a price for crude, then hedge that commitment in the crude futures market with a short hedge. If prices fall, the gatherer has profits in the futures market that offset his reduced revenue from the producer. If prices rise, the increased cash price offsets losses in the futures market.

While the producer with reserves, or the crude oil gatherer, executes a "short" hedge, or sells in the futures market, a long hedge is executed by buying futures contracts to lock in the price of oil that is needed in the future.

For instance, a fuel oil marketer may need to lock in his cost in order to offer a fixed price to a customer. This can be done by buying futures contracts—a long hedge.

If the price of fuel oil drops, the margin the marketer received will decrease; it is possible fuel oil could cost more than the marketer's selling price.

But with a hedge position in place, the loss in the physical market would be offset by gains in the futures transactions.

End users can also fix fuel costs by executing long hedges. For example, a buyer of diesel could take a long hedge by purchasing heating oil futures. Assuming no change in basis, if cash prices increased, the futures profits would offset the increased cash costs. And if prices fell, the futures loss would be offset by the benefits of the lower cash costs.

Options expand the range of strategies

The use of energy options has grown in tandem with growth in energy futures trading volumes. And new options contracts have been introduced to offer additional flexibility.

Calls and puts add two more ways to "go long" the market and two more ways to "go short" the market.

Heating oil options began trading on the New York Mercantile Exchange in June 1987 and trading in gasoline options is scheduled to begin this year. Crude oil options trading was introduced in November 1986 and in the first full year of trading, more than 3 million trades were made.

There are two types of options—calls and puts. The buyer of a call obtains the right, but not the obligation, to buy a specific crude oil futures contract at a fixed price—the strike price. The strike price and the delivry month of the futures contract are determined at execution of the option trade.

The buyer of a put obtains the right to sell a specific crude oil futures contract; the strike price and delivery month are agreed upon when the option trade is made.

An option holder (buyer) wanting to use his option to establish a position in crude oil futures must exercise the option before it expires. On the Nymex, options expire at the close of trading on the first Friday of the month preceeding the delivery month of the underlying crude oil futures contract.

Options expire earlier than the underlying futures contract so traders that have acquired futures positions through the exercise of options have time to liquidate them or arrange for delivery.

The call writer (option seller) grants the call buyer the right to buy a futures contract; the put writer grants the put buyer the right to sell a futures contract.

Option buyers pay option writers a premium for the rights they obtain. This premium, the price of the option, is determined in the trading pit. Premiums are quoted in dollars and cents per barrel for crude oil options, and each call and each put represents one futures contract.

Crude oil price volatility is a key to the price of crude oil options. The more volatile the crude oil market, the higher the option premiums. Other factors that help determine option premiums include the current price of the underlying futures contract, the option's strike price, time to expiration

COUNTRY	ESTIMATED PROVED RESERVES 1-1-1989		OIL PRODUCTION			REFINING Capacity (b/cd) January 1, 1988				
	Oil (1,000 bbl)	Gas (10^9 cu ft)	Producing wells* Dec 31, 88	Estimated 1987 (1,000 b/d)	% change from 1986	No. of ref.	Crude	Thermal operations	Catalytic cracking	Catalytic reforming
ASIA-PACIFIC										
Australia	1,691,960	18,610	869	566.1	+10.3	10	637,100	...	184,800	154,800
Bangladesh	500	12,720	10	0.5	...	1	31,200	...	...	1,650
Brunei	1,420,000	7,010	609	133.7	− 8.5	1	10,000	...	...	...
Burma	58,000	9,460	450	24.0	−20.0	2	26,300	1,700	...	...
China, Taiwan	5,400	890	90	2.6	+35.7	2	600,000	15,000	25,000	62,500
India	4,250,000	17,550	2,670	608.7	− 2.8	12	1,058,742	113,900	133,470	26,690
Indonesia	8,400,000	73,000	5,774	1,185.8	− 5.6	6	714,200	92,500	12,600	62,100
Japan	56,790	1,030	387	12.1	− 2.2	43	4,566,850	82,800	557,150	533,940
Korea, South	...	...	...	...	...	5	820,000	30,000	...	59,450
Malaysia	2,900,000	52,200	452	467.4	− 4.4	4	212,300	...	...	21,410
New Zealand	160,000	5,200	38	28.3	− 4.2	1	81,700	...	...	21,700
Pakistan	96,000	22,400	44	41.6	+ 1.4	3	130,050	...	...	5,450
Papua New Guinea	200,000	1,000	...	...	...	...	...	...	...	...
Philippines	16,000	10	10	5.1	−25.6	4	286,000	...	23,100	40,200
Singapore	...	...	...	...	...	5	858,000	137,700	....	54,300
Sri Lanka	...	...	...	...	...	1	50,000	12,500	...	3,750
Thailand	99,000	3,720	167	31.3	− 9.7	3	191,860	9,600	9,250	25,300
Total Asia-Pacific	**19,353,650**	**224,800**	**11,570**	**3,107.2**	**− 2.5**	**103**	**10,274,302**	**495,700**	**945,370**	**1,073,240**
WESTERN EUROPE										
Austria	105,000	420	1,177	21.6	+ 2.8	1	204,000	17,000	24,000	32,000
Belgium	...	...	...	...	...	4	630,500	62,800	102,000	80,300
Cyprus	...	...	...	...	...	1	16,000	...	...	3,400
Denmark	440,000	4,400	40	94.0	+27.2	3	177,000	70,670	...	31,100
Finland	...	...	...	...	...	2	241,000	46,300	41,800	42,900
France	212,620	1,170	583	63.5	+ 7.2	14	1,940,600	163,550	288,800	258,700
Germany, Fed. Rep.	316,000	6,400	3,129	73.8	− 6.8	16	1,647,800	286,400	174,700	307,100
Greece	21,600	20	16	24.4	− 7.9	4	384,500	41,120	50,500	51,300
Ireland	...	1,900	...	...	...	1	56,000	...	...	11,000
Italy-Sicily	739,000	10,200	239	50.0	+ 2.0	19	2,563,100	388,400	277,400	289,600
Netherlands	195,000	64,100	550	91.3	+ 2.5	7	1,381,000	151,560	125,500	157,400
Norway	14,800,000	105,940	202	973.3	+16.0	3	240,000	85,500	...	29,150
Portugal	...	...	...	...	...	3	294,300	...	10,100	35,400
Spain	38,600	600	48	32.8	−13.1	10	1,305,000	178,000	143,500	189,100
Sweden	...	...	...	...	...	5	436,500	68,000	27,000	72,700
Switzerland	...	...	...	...	...	2	132,000	20,000	...	26,000
Turkey	380,000	1,030	564	52.0	+ 3.9	5	675,595	4,500	34,100	65,370
United Kingdom	5,200,000	22,000	710	2,445.9	− 3.0	15	1,802,700	152,000	392,000	367,500
Total Western Europe	**22,447,820**	**218,180**	**7,258**	**3,922.6**	**+ 2.0**	**115**	**14,127,595**	**1,735,800**	**1,691,400**	**2,050,020**
MIDDLE EAST										
Abu Dhabi	92,205,000	183,500	517	969.4	+ 3.0	2	180,000	...	...	30,055
Bahrain	140,550	6,900	279	43.2	+9.1	1	250,000	13,000	36,000	17,100
Dubai	4,000,000	6,000	150	381.2	+14.0	...	...	...	...	...
Iran	92,850,000	489,400	361	2,341.7	+26.7	4	530,000	80,800	...	63,845
Iraq	100,000,000	26,300	615	2,095.8	+24.0	7	318,500	...	...	43,500
Israel	700	30	9	1.0	...	2	180,000	70,000	20,000	26,000
Jordan	12,000	...	10	4.0	...	1	100,000	....	4,410	8,640
Kuwait	91,920,000	36,400	363	1,095.8	−11.9	4	628,000	...	30,000	51,000
Lebanon	...	...	...	...	...	2	37,000	...	7,250	7,492
Neutral Zone	5,210,000	12,300	491	399.2	+16.4	...	...	...	...	...
Oman	4,012,000	9,500	789	565.0	+ 1.2	1	76,932	...	...	15,386
Qatar	3,150,000	156,700	174	284.4	−14.6	1	62,000	...	...	12,030
Ras al Khaimah	400,000	2,000	6	10.0	+ 9.0	...	...	...	...	...
Saudi Arabia	166,980,000	139,900	588	4,054.2	−16.8	7	1,375,000	27,000	76,000	178,900
Sharjah	1,500,000	12,000	20	66.9	+ 9.4	...	...	...	...	...
Syria	1,750,000	1,500	963	231.7	+19.4	2	228,790	41,199	...	19,348
Yemen, North	550,000	1,600	45	10.0	...	1	10,000	...	...	2,500
Yemen, South	...	...	...	...	...	1	170,000	...	...	12,000
Total Middle East	**564,680,250**	**1,084,030**	**5,380**	**12,553.5**	**+ 0.5**	**36**	**4,146,222**	**237,999**	**173,660**	**487,796**

EDITOR'S NOTE: All reserves figures except those for the U.S.S.R. (and gas for Canada) are reported as proved reserves recoverable with present technology and prices. U.S.S.R. figures are "explored reserves" which include proved, probable, and some possible. Canadian gas figure, under criteria adopted by Canadian Petroleum Association in 1980, includes proved and some probable. *Does not include shut in, injection, or service wells. †Estimates based on capacity as of Jan. 1, 1987, plus known 1987 closures and expansions. ‡Includes Albania, Bulgaria, Cuba, Czechoslovakia, East Germany, Hungary, Mongolia, North Korea, Poland, Romania, Viet Nam, and Yugoslavia.

COUNTRY	ESTIMATED PROVED RESERVES 1-1-1988		OIL PRODUCTION			REFINING Capacity (b/cd) January 1, 1988				
	Oil (1,000 bbl)	Gas (10^9 cu ft)	Producing wells* Dec 31, 86	Estimated 1987 (1,000 b/d)	% change from 1986	No. of ref.	Crude	Thermal operations	Catalytic cracking	Catalytic reforming
AFRICA										
Algeria	8,500,000	105,900	840	647.9	+ 4.0	4	464,700	...	...	55,600
Angola-Cabinda	1,149,000	1,760	381	341.3	+21.0	1	32,100	...	...	1,900
Benin	100,000	...	6	12.0	+55.8	...	...	...	...	...
Cameroon	520,000	3,880	176	170.0	− 5.6	1	43,000	...	...	6,500
Congo	720,000	2,470	286	118.0	+ 2.6	1	21,000	...	...	2,000
Cote d'Ivoire	...	...	...	...	...	2	60,000	...	...	16,600
Egypt	4,300,000	10,240	724	899.3	+10.6	7	452,110	16,470	...	30,940
Ethiopia	...	...	...	...	...	1	18,000	...	...	2,200
Gabon	645,000	600	295	155.8	− 3.2	1	23,000	7,200	...	1,500
Ghana	1,000	...	...	...	...	1	28,000	...	...	5,550
Ivory Coast	120,000	3,530	14	16.0	− 7.9	...	...	...	...	...
Kenya	...	...	...	...	...	1	90,000	...	...	9,000
Liberia	...	...	...	...	...	1	15,000	...	...	2,000
Libya	21,000,000	25,700	661	1,019.7	− 1.1	2	329,400	...	...	14,582
Madagascar	...	...	...	...	...	1	16,350	...	...	2,600
Morocco	2,700	70	4	0.3	− 5.0	2	154,600	...	5,600	26,800
Mozambique	...	2,200	...	...	...	...	...	...	...	...
Nigeria	15,980,000	84,000	1,253	1,238.6	−15.5	3	270,000	...	47,000	39,700
Senegal	...	...	...	...	...	1	29,800	...	...	2,870
Sierra Leone	...	...	...	...	...	1	10,000	...	...	...
Somalia	...	210	...	...	...	1	10,000	...	...	...
South Africa	...	980	...	...	...	4	433,500	63,500	84,400	62,800
Sudan	300,000	...	...	...	...	1	21,440	...	...	1,700
Tanzania	...	4,100	...	...	...	1	13,500	...	...	3,000
Togo	...	...	...	...	...	1	20,000	...	...	4,400
Tunisia	1,800,000	2,960	150	104.3	− 2.9	1	34,000	...	...	3,300
Zaire	112,000	30	104	31.8	− 2.0	1	17,000	...	...	3,000
Zambia	...	...	...	...	...	1	23,750	...	5,040	5,040
Total Africa	**55,249,700**	**248,630**	**4,894**	**4,755.0**	**− 1.7**	**42**	**2,630,250**	**87,170**	**142,040**	**303,582**
WESTERN HEMISPHERE										
Argentina	2,270,000	23,600	8,389	419.1	− 1.1	11	689,500	120,800	112,450	39,600
Barbados	3,620	10	75	1.4	− 9.1	1	3,000	...	...	...
Bolivia	156,000	5,040	296	18.5	+ 5.3	3	46,930	...	...	14,158
Brazil	2,340,000	3,600	4,880	562.8	− 1.9	13	1,407,300	33,800	350,500	24,800
Canada	6,825,000	98,000	35,246	1,506.3	+ 2.5	27	1,868,900	78,150	385,550	368,650
Chile	290,000	4,200	347	28.3	−15.3	2	141,000	18,400	37,000	5,300
Colombia	1,590,000	3,600	2,770	387.8	+29.1	4	226,000	60,000	91,000	6,000
Costa Rica	...	...	...	...	...	1	16,200	6,500	...	1,200
Dominican Republic	...	...	...	...	...	2	48,500	...	...	7,900
Ecuador	1,615,000	4,020	922	157.2	−45.2	3	122,000	25,200	16,000	2,780
El Salvador	...	...	...	...	...	1	17,000	...	...	3,800
Guatemala	41,500	20	12	3.9	−20.6	1	16,000	...	...	3,000
Honduras	...	...	...	...	...	1	14,000	...	...	1,800
Jamaica	...	...	...	...	...	1	35,500	...	...	3,540
Martinique	...	...	...	...	...	1	12,800	...	...	7,410
Mexico	48,610,000	76,530	3,768	2,537.8	+ 4.5	9	1,354,000	82,000	267,000	157,800
Netherlands Antilles	...	...	...	...	...	2	320,000	67,000	42,000	15,000
Nicaragua	...	...	...	...	...	1	14,500	...	...	2,800
Panama	...	...	...	...	...	1	100,000	...	...	7,500
Paraguay	...	...	...	...	...	1	7,500	...	...	...
Peru	511,860	650	3,438	166.7	− 7.1	6	182,018	...	21,305	1,680
Puerto Rico	...	...	...	...	...	2	123,000	...	12,000	5,800
Suriname	27,000	...	56	2.2	+13.4	...	...	...	...	...
Trinidad & Tobago	567,000	10,390	3,211	163.1	− 3.4	2	300,000	18,000	25,000	31,000
Uruguay	...	...	...	...	...	1	45,000	...	5,000	3,000
Venezuela	56,300,000	95,000	9,797	1,591.9	− 3.2	6	1,201,100	138,000	193,100	6,000
Virgin Islands	...	...	...	...	...	1	545,000	80,000	...	125,000
United States	25,270,000	186,700	636,475	8,276.7	− 4.6	†187	†15,288,274	†1,789,088	†5,014,195	†3,595,532
Total Western Hemisphere	**146,416,980**	**511,360**	**709,682**	**15,825.7**	**− 2.4**	**291**	**24,145,022**	**2,516,938**	**6,572,100**	**4,441,050**
Total non-Communist	**808,148,400**	**2,287,000**	**738,784**	**40,164.0**	**− 1.0**	**587**	**55,323,391**	**5,073,607**	**9,524,570**	**8,355,688**
COMMUNIST AREAS										
China	18,400,000	30,700	34,000	2,647.0	+ 1.0	40	2,200,000	NA	NA	NA
U.S.S.R.	59,000,000	1,450,000	128,000	12,486.5	+ 1.5	39	12,260,000	NA	NA	NA
Other§	1,800,000	29,300	NA	422.0	− 1.2	45	3,150,000	NA	NA	NA
Total Communist	**79,200,000**	**1,510,000**	**162,000**	**15,555.5**	**+ 1.4**	**124**	**17,610,000**	**NA**	**NA**	**NA**
TOTAL WORLD	**887,348,400**	**3,797,000**	**900,784**	**55,719.5**	**− 0.4**	**711**	**72,933,391**	**5,073,607**	**9,524,570**	**8,355,688**

Worldwide Production

• Offshore (e) Estimated (c) Condensate (NA) Not available

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
ABU DHABI[e]	DEPARTMENT OF PETROLEUM	• Arzanah, 1973	11,000-11,300					42.0
		• Abu Al Bukhoosh, 1969	8,900-10,900					32.0
		• Mubarras, 1969	8,300-10,000					37.0
		• El Bunduq, 1964	9,400-10,900					40.0
		Asab, 1965	8,000- 8,700	517	862	941,590	8,035,410,900	41.0
		Bab, 1958	8,600- 9,300					44.0
		Bu-Hasa, 1962	8,300- 9,200					39.0
		Sahil, 1967	9,500- 9,800					41.0
		• Umm Shaif, 1958	9,800-12,000					37.0
		• Zakum, 1963	9,600-12,000					39.0
		• Umm al-Dalkh, 1969	7,700-8,500					...
		Total Abu Dhabi		517	862	941,590	8,035,410,900	
ALGERIA[e]	SONATRACH	Zarzaitine, 1957	4,700					42.2
		Edjeleh, 1956	1,500- 2,800					37.2
		Tiguentourine, 1966	2,160- 4,265					44.4
		El Adeb Lareche, 1958	4,100					43.3
		Assakaifaf N. & S., 1958	2,800					42.7
		Tan Emellel N. & S., 1960	2,800- 4,500					42.5
		Edeyen, 1964	5,580					41.5
		Hassi Mazoula S., 1963	4,430					40.2
		Hassi Mazoula B., 1965	4,920					42.0
		Acheb W. & Kreb, 1963 & 1960	7,360					45.6
		Tin Fouye N. +F6, 1962	4,265					39.6
		El Borma, 1967	8,200					42.9
		Keskassa, 1968	8,860					42.9
		Mereksen, 1974	9,420					45.8
		Gara, 1962	9,420					42.9
		Hassi Messaoud N., 1956	10,500					45.9
		Hassi Messaoud S., 1956	10,500					46.1
		Gassi-Touil & Gassi-Touil E., 1961	6,890					50.6-50.8
		Hassi Chergui	8,200					50.6
		Nezla N., 1965	8,530					51.5
		Rhourde El Baguel, 1962	9,850					40.2
		Mesdar E. & W., 1972	11,155					40.3
		El Gassi-El Agreb, 1959	10,170	840	840	23,000	7,300,895,000	47.9
		Rhourde Nouss & E., 1972	8,530					39.7
		Tin Foye Tabankort, 1966	4,600- 6,560					41.1-41.3
		Djoua W., 1967	5,580- 6,240					41.1
		Amassak, 1970	6,565					41.1
		Tamendjelt, 1970	5,585- 6,890					41.1
		Timedratine, 1964	8,155					42.7
		Ohanet N. & S., 1960	7,878					43.8
		Askarene, 1962	8,200					41.7
		Guelta, 1962	8,960					41.7
		Stah, 1971	9,515					45.8
		Ras Toumb, 1976	9,190					35.7
		Haoud Berkaoui-Ben Kahla, 1965	11,000					43.6
		Guellala-Guellala N.E., 1969	11,320					42.2-42.3
		N'Goussa, 1974	11,715					42.2
		Kef El Argoub, 1973	12,570					42.2
		Oued Noumer, 1969	8,860					48.3
		Djorf, 1974	9,025					48.3
		Djebel Onk, 1960	3,940					37.0
		Alrar FJT	...					...
		Hassi R'Mel[c]	...					...
		Gassi Touil[c]	...					...
		Other Crude	...					...
		Condensate	...					...
		Total Algeria		840	840	623,000	7,300,895,000	
ANGOLA	FINA ANGOLA	Benfica, 1955	8,300	1	11	15	2,266,000	30.0
		Cacuaco, 1958	7,870	2	8	17	245,000	30.0
		Galinda, 1959	7,220	...	8	...	2,245,000	30.0
		Tobias, 1961	1,970	1	8	56	28,794,000	31.0
		Mulenvos, 1966	5,900- 6,600	7	12	230	4,957,000	25.0
		Quenguela, 1968	6,000	30	58	2,375	36,146,000	31.0
		Legua, 1972	6,300	1	2	95	624,000	31.0
		Bento, 1972	7,350	1	3	295	4,797,000	26.0

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
		C. Cobra, 1969	4,000	11	13	660	2,622,000	41.0
		Quinguila, 1972	3,400	18	31	8,050	30,158,000	36.0
		N'Zombo, 1973	5,000- 6,300	24	29	12,835	83,400,000	33.0
		Quinfuquena, 1975	6,800- 7,100	13	15	5,030	22,563,000	32.0
		Ganda, 1975	5,000	3	3	2,460	4,729,000	36.0
		Sereia, 1974	6,200	2	3	205	851,000	27.0
		Lumueno, 1977	4,600	8	11	2,260	2,657,000	37.0
		Pambo, 1982	4,600	4	4	815	1,420,000	39.0
		Luango, 1977	3,800	3	3	775	1,697,000	38.0
	CHEVRON	• Malongo North, 1966	1,170- 9,250	63	74	14,066	205,468,645	30.0
		• Malongo West, 1967	1,680- 8,800	22	37	16,904	223,720,583	22.5
		• Malongo South, 1966	1,150- 1,440	29	33	8,542	69,129,227	25.0
		• Kali, 1969	11,400-11,660	1	1	403	4,117,231	30.0
		• Kungulo, 1975	4,000	16	17	12,477	39,338,146	32.2
		• Limba, 1969	2,660- 7,350	10	14	11,427	81,176,855	31.6
		• Kambala, 1971	10,500	5	5	7,564	15,220,236	32.8
		• Livuite, 1979	8,000	5	7	723	2,313,862	31.7
		• Takula, 1971	3,070- 9,090	68	71	107,260	111,037,798	31.5
		• Lifuma, 1984	7,800	...	1	512	187,404	31.4
		• Vuko, 1983	3,700	5	6	10,071	3,750,149	35.0
		• Wamba, 1982	2,700	7	7	137	50,000	29.0
	TEXACO	• Cuntala, 1978	7,200	1	3	169	2,152,306	31.0
		• Essungo, 1975	6,500	10	16	5,897	17,642,319	35.0
	ELF ANGOLA[e]	• Palanca, 1981	8,860	8	8	37,700	22,834,700	40.0
		• Pacassa, 1982	11,500	2	2	12,005	2,948,400	38.0
		Total Angola		**381**	**524**	**282,030**	**1,031,258,861**	
ARGENTINA	YPF	Chubut, 1907	1,908- 9,168	2,171	2,220	85,776	967,339,718	21.1-26.0
		Jujuy, 1969	2,461-16,732	9	10	1,283	60,548,706	46.5-47.0
		La Pampa, 1968	3,609- 4,921	180	185	8,069	71,804,456	31.0
		Mendoza, 1932	2,178-16,778	1,087	1,113	94,769	1,037,956,207	23.7-32.0
		Neuquen, 1918	1,312-12,498	986	1,049	62,431	460,737,391	24.0-41.0
		Rio Negro, 1960	2,953- 7,546	794	853	41,130	425,218,830	22.5-41.0
		Salta, 1928	6,551-15,092	41	60	12,830	116,198,809	29.0-59.0
		Santa Cruz, 1946	1,468-17,060	2,935	3,014	95,662	950,013,139	21.1-30.0
		Tierra del Fuego, 1959	5,249- 7,824	182	196	18,439	146,176,000	43.4-46.0
		Formosa, 1984	11,466-11,490	4	5	3,434	3,440,901	42.0-42.9
		Total Argentina		**8,389**	**8,705**	**423,823**	**4,239,434,157**	
AUSTRALIA	BARRACK ENERGY	Mount Horner, 1965	3,800- 5,800	1	4	11	10,652	38.0
	BHP PETROLEUM PTY. LTD.	• Jabiru, 1983	4,786	1	1	14,120	2,005,022	42.3
		Riverslea, 1981	4,504	2	3	163	254,364	25.2
		Yapunyah, 1982	4,311	1	1	4	17,268	39.2
	BOND CORP., PETROLEUM DIVISION	• Harriet, 1983	6,230	7	7	7,900	2,739,500	38.2
	BRIDGE OIL LTD.	Thornby Creek, 1979	5,180	...	4	...	52,833	50.0
		Yellow Bank Creek, 1982	5,064	2	3	124	315,300	52.0
		Louise, 1986	5,900	1	2	146	27,100	59.0
		Narrows, 1986	5,740	1	1	10	970	59.0
	CSR OIL & GAS DIV. BRISBANE	Anabranch, 1965	4,188	1	1	10	12,132	44.0
		Duarran, 1964	4,105	...	1	...	14,036	37.0
		Maffra, 1965	4,251	2	1	16	21,614	48.0
		Richmond, 1963	3,643	1	1	6	15,355	43.0
		Snake Creek, 1964	4,990	1	1	22	10,881	67.0
		Sunny Bank, 1962	6,139	...	1	...	706	40.0
		Trinidad, 1965	4,599	1	2	1	62,341	46.0
	DELHI PETROLEUM	Jackson, 1981	4,750	29	29	14,890	14,170,000	40.0-48.0
		Jackson South, 1982	4,800	6	6	1,555	1,503,000	40.8
		Chookoo, 1985	6,000	2	3	315	139,000	45.0
		Wilson, 1983	5,000	6	6	461	366,000	40.0
		Naccowlah South, 1983	6,000	6	6	2,084	1,744,000	40.0-46.0
		Gunna, 1983	6,000	1	1	52	58,000	40.0
		Tinpilla, 1983	6,000	1	1	39	53,000	40.0
		Naccowlah West, 1983	5,700	6	6	1,472	1,122,000	40.0
		Bogala, 1984	6,900	1	1	185	188,000	40.0
		Yanda, 1984	8,000	1	2	40	24,000	40.0
		Mooliampah, 1985	6,000	1	1	87	42,000	40.0
		Watson South, 1985	5,500	1	2	507	257,000	40.0
		Sigma, 1983	5,700	1	1	84	36,000	40.0
		Tickalara, 1984	5,600	1	2	115	69,000	40.0
		Big Lake, 1984	6,600	4	4	274	198,000	45.0-48.0
		Gidgealpa, 1984	6,150	11	11	2,167	1,386,000	45.0-50.0
		McKinlay, 1985	5,100	1	2	38	18,000	41.0
		Strzelecki, 1978	5,800	17	17	6,699	9,675,000	43.0-49.0
		Dullingari, 1979	5,200	1	2	3,797	5,228,000	45.0

WORLDWIDE PRODUCTION

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	Narcoonowie, 1983	6,000	1	2	118	79,000	52.0-53.0
	Limestone Creek/Biala, 1984	5,100	4	5	1,387	608,000	41.0
	Wancoocha, 1984	6,000	4	5	1,118	768,000	44.0-54.0
	Muteroo, 1985	6,000	3	3	2,063	957,000	45.0
	Spencer, 1986	6,500	2	2	463	169,000	47.0
	Jena, 1985	5,200	1	1	82	32,000	41.0
	Alwyn, 1985	5,200	1	1	133	42,000	41.0
	Dirkala, 1986	7,000	1	2	780	222,000	56.0
	Nungaroo, 1985	4,150	1	1	130	19,000	40.0
	Ulandi, 1985	5,200	1	1	82	43,000	40.4
	Watson, 1985	...	2	2	28	10,000	...
	Cooroo/Cooroo North, 1986	...	3	3	NA	3,000	...
	Challum, 1983	...	1	1	9	8,000	...
	Kerinna, 1984	4,300	1	1	80	7,000	41.0
	Kercummura, 1985	...	...	1	...	1,000	50.8
	Cook, 1985	...	...	...	18	15,000	...
ESSO-BHP[e]	• Barracouta, 1965	4,550	2	2			62.8
	• Marlin, 1966	5,100	1	4			50.0
	• Kingfish, 1967	7,500	26	37			46.9
	• Halibut, 1967	7,700	10	17			43.3
	• Mackerel, 1969	7,700	18	18			45.6
	• Tuna, 1968	6,500	20	22	403,281	2,260,364,560	40.5
	• Snapper, 1968	4,350	16	21			47.0
	• Cobia, 1972	7,700	10	12			44.6
	• West Kingfish, 1968	7,500	15	18			46.9
	• Fortescue, 1978	7,700	23	25			43.0
	• Flounder, 1968	8,200	8	10			46.7
HARTOGEN GROUP	Kooroopa, 1985	3,300	1	1	20	10,783	42.0
	Talgeberry, 1985	3,900	3	3	167	87,889	46.0
	Washpool, 1985	5,250	...	1	...	...	35.0
	Toobunyah, 1985	3,500	4	4	235	89,157	43.0
	Takyah, 1985	3,800	2	2	12	4,605	43.0
	Ipundu, 1986	2,700	1	1	44	15,900	43.0
	Borah Creek, 1982	4,900	...	2	...	8,265	34.0
	Kincora, 1980	4,700	4	4	53	284,214	34.0
	Sandy Creek, 1982	4,900	1	1	4	7,068	34.0
	Waratah, 1982	5,350	4	5	127	236,018	34.0
	Tintaburra, 1984	3,500	6	6	381	261,098	43.0
HOME ENERGY	Blina, 1981	4,300	6	6	797	899,608	37.0
	Sundown, 1983	3,600	2	4	150	141,990	39.0
	West Terrace, 1985	3,800	1	1	136	85,619	33.0
LASMO	Bodalla South, 1984	4,800- 5,230	6	6	2,776	1,873,236	47.2-48.7
	Kenmore, 1985	4,600- 4,980	8	8	2,447	1,001,209	48.2-45.8
	Black Stump, 1986	5,360	1	1	198	72,351	45.2
	Glenvale, 1985	3,800	1	1	11	4,353	49.3
TMOC RESOURCES LTD.	Moonie, 1961	5,800	27	36	656	21,439,311	44.5
	Alton, 1964	6,000	6	9	28	1,880,463	49.5
	Bennett, 1965	5,960	1	2	5	114,025	45.0
	Cabawin, 1961	10,800	1	1	10	57,827	49.0
	Mereenie, 1964	4,000	24	36	3,412	2,267,318	48.9
PANCONTINENTAL PETROLEUM LTD.	Nockatunga, 1983	5,420	4	5	294	155,931	49.6
	Winna, 1985	4,526	1	1	130	51,678	46.3
	Koora, 1985	4,822	1	2	2	944	41.7
	Thungo, 1986	4,670	1	1	1	21,399	45.7
	Kihee, 1986	3,200	1	1	59	212	44.7
SANTOS LTD.	Tirrawarra, 1970	9,500	29	35	4,550	5,944,000	52.0
	Moorari, 1971	7,705- 9,400	5	6	578	939,000	46.9
	Fly Lake, 1971	9,300	3	3	237	435,000	53.0
	Brolga, 1983	9,547	1	1	82	31,000	53.0
	Woolkina, 1982	9,700	1	1	103	89,000	51.5
	Merrimelia, 1964	5,250- 7,070	10	11	1,307	2,073,224	35.5
	Meranji, 1985	5,660	2	2	426	186,000	41.0
	Bookabourdie, 1984	7,000	1	1	66	17,000	46.0
STRATA OIL	Woodada,[c] 1980	7,400	...	...	...	24,862	54.0
WAPET GROUP	Barrow Island, 1964	1,200- 6,700	394	504	19,178	218,193,074	37.0
	Dongara, 1969	5,250- 5,577	4	8	126	886,950	35.5
WOODSIDE	North Rankin,[c] 1972	9,800	7	8	7,402	4,965,395	52.3
	Total Australia		869	1,084	513,367	2,570,040,610	
AUSTRIA							
MOBIL	Voitsdorf, 1963	7,000	26	38	586	21,423,279	36.0
	Sattledt, 1971	5,700	13	18	621	4,861,898	37.0
	Kemating, 1979	6,100	8	9	956	3,332,235	34.0
	Gaiselberg, 1938	5,200	34	69	792	31,842,068	26.0
	Other	...	71	109	2,230	25,515,908	33.0

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	OEMV[e]	Hochleiten, 1977	3,100- 5,000					21.3
		Matzen, 1949	6,100					25.7
		Pirawarth, 1957	1,600- 6,500	1,025	1,025	15,817	565,558,168	28.4
		St. Ulrich, 1938	1,600- 4,300					31.1
		Other	...					...
		Total Austria		**1,177**	**1,268**	**21,002**	**652,533,556**	
BAHRAIN	BAHOCO	Awali, 1932	1,850- 4,600	279	351	39,580	770,722,000	33.0
		Total Bahrain		**279**	**351**	**39,580**	**770,722,000**	
BARBADOS	BARB. NOC	Woodbourne, 1966	1,[illegible]-7,701	75	135	1,532	4,093,539	29.0
		Total Barbados		**75**	**135**	**1,532**	**4,093,539**	
BENIN[e]	PAN OCEAN	Seme, 1968	6,232	6	6	7,700	9,594,780	22.6
		Total Benin		**6**	**6**	**7,700**	**9,594,780**	
BOLIVIA	YPFB[e]	Camiri, 1927	3,936	45	45			55.0
		Carand, 1960	3,940	33	33			60.0
		Colpa, 1961	9,184	15	15			65.0
		Monteagudo, 1966	4,592	25	25			41.0
		La Pena, 1965	8,856	17	17			43.0
		Palmar, 1964	10,758	6	6			65.0
		Rio Grande, 1961	9,512	37	37	12,405	269,810,296	62.0
		Vuelta Grande, 1978	8,220	6	6			67.0
		Espino, 1979	14,655	1	1			56.2
		San Rogue, 1981	7,170	5	5			71.0
		Santa Cruz, 1986	9,350	5	5			65.0
		Other	...	79	79			...
	OCCIDENTAL	Tita, 1976	6,450	10	15	266	4,025,438	67.9
		Porvenir, 1978	9,600	6	9	3,597	9,292,999	60.5
	TESORO BOLIVIA PETROLEUM CO.	La Vertiente, 1977	15,230	6	7	1,298	3,683,076	64.1
		Escondido, 1980	11,293	...	3	...	...	60.0
		Taiguati, 1981	10,174	...	1	...	...	63.0
		Los Suris, 1981	13,577	...	1	...	...	50.0
		Total Bolivia		**296**	**310**	**17,566**	**286,811,809**	
BRAZIL	ALAGOAS	Furado, 1969	4,440- 5,500	49	58	2,260	12,950,700	35.0
		Pilar, 1981	4,100- 5,100	46	72	8,130	7,208,110	40.0
		Tabuleiro de Martins, 1957	3,900- 4,950	20	28	600	3,677,000	27.0
		• Mero, 1974	6,500- 7,400	...	...	...	150,950	35.0
		Other	...	15	22	340	1,641,640	...
	AMAZONAS	Igarapé Cuia, 1985	3,600- 3,700	...	...	101	20,751	41.0
		Rio Urucú, 1986	7,500- 8,300	...	...	...	...	44.0
	BAHIA	Agua Grande, 1951	820- 4,265	112	131	5,600	271,669,040	40.0
		Aracas, 1965	3,280- 8,856	136	151	7,530	106,593,240	41.0
		Buracica, 1959	1,476- 1,840	185	214	7,430	133,117,320	35.0
		Faz. Imbe, 1964	2,130- 5,575	55	58	1,720	14,019,960	40.0
		Faz. Boa Esperanca, 1966	7,215- 8,036	12	16	550	14,869,090	39.0
		Faz. Panelas, 1962	2,400- 5,100	11	13	530	6,270,930	37.0
		Malombe, 1966	3,280	15	21	520	6,667,190	41.0
		Mata/Remanso, 1971	4,445- 4,560	75	91	2,460	18,699,570	35.0
		Miranga, 1965	3,280- 3,936	201	232	10,960	180,215,340	40.0
		Rio Dos Ovos, 1979	2,410- 3,750	10	16	330	1,773,720	35.0
		Santana, 1962	2,400- 4,000	4	6	220	5,446,970	37.0
		Sesmaria, 1983	3,100- 4,600	32	37	1,190	2,515,920	40.0
		Candeias, 1941	3,280- 7,415	33	36	2,790	76,395,910	30.0
		Cassarongongo, 1959	1,475- 4,755	39	50	1,520	14,013,670	32.0
		Dom Joao Terra, 1947	920- 1,350	50	70	950	20,007,850	38.0
		Riacho da Barra, 1982	2,910- 3,998	55	58	5,880	8,912,650	39.0
		Taquipe, 1958	3,115- 3,935	71	94	4,270	82,509,600	40.0
		• Candeias Mar, 1941	3,300- 7,400	13	15	600	6,711,220	30.0
		• Dom Joao Mar, 1947	920- 3,000	285	296	4,910	79,927,590	38.0
		• Ilheus, 1979	1,500	...	...	...	893,150	41.0
		Cexis, 1983	1,670- 5,230	17	19	2,030	2,239,170	30.0
		Faz. Balsamo, 1983	2,500- 4,000	70	101	5,530	3,251,830	31.0
		Rio Pojuca, 1982	5,600- 6,200	19	21	2,320	3,006,520	35.0
		Faz. Alvorada, 1983	2,100- 4,900	32	58	4,190	2,415,280	31.0
		Rio do Bú, 1984	2,900- 3,000	22	26	1,910	930,890	33.0
		Other	...	130	155	3,200	20,693,180	...
	CEARÁ	Faz. Belem, 1980	1,150- 2,500	281	287	2,770	3,188,930	13.0
		• Curima, 1978	6,888	13	17	6,260	14,768,450	32.0
		• Xareu, 1977	5,717- 5,766	17	28	6,000	12,164,470	39.0
		• Atum, 1983	5,800- 6,750	8	10	4,360	5,402,940	25.0

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
		• Espada, 1983	5,750- 6,900	6	6	2,070	2,736,060	26.0
	ESPIRITO SANTO	Faz. Cedro, 1962	5,248	10	15	960	9,258,590	28.0
		Sao Mateus, 1969	5,750	53	58	1,700	3,547,450	27.0
		Lagoa Parda, 1977	5,576	40	41	4,600	19,240,500	30.0
		Rio Itaunas, 1977	5,400	35	38	1,310	2,931,050	28.0
		• Cacao, 1978	9,184	4	4	1,480	8,120,130	32.0
		Lagoa Suruaca, 1982	6,400	20	24	2,650	3,956,280	30.0
		Lagoa Piabanha, 1984	6,500	8	11	2,150	1,333,440	27.0
		Other	...	110	131	3,240	5,308,580	...
	RIO DE JANEIRO	• Enchova, 1976	6,973- 7,885	17	17	32,170	60,841,200	23.0
		• Bonito, 1977	6,950- 8,000	12	12	12,160	24,593,100	27.0
		• Garoupa, 1974	11,382	16	17	23,450	54,476,000	30.0
		• Namorado, 1975	10,083	17	21	62,500	76,156,900	28.0
		• Garoupinha, 1974	12,693	3	3	3,640	8,944,100	30.0
		• Pampo, 1977	6,215	24	24	73,180	65,665,200	21.0
		• Area RJS-236 Trilha, 1983	8,800-11,000	5	5	6,690	7,189,200	28.0
		• Linguado, 1981	9,000-11,000	12	12	32,170	41,971,800	20.0
		• Badejo, 1981	8,500-10,500	7	7	9,310	12,869,000	28.0
		• Bicudo, 1982	8,000-11,000	6	6	11,440	27,002,100	22.0
		• Corvina, 1983	9,000-11,000	6	6	15,030	18,051,700	25.0
		• Pirauna, 1982	8,000-10,500	7	7	14,680	16,403,800	27.0
		• Sul de Pampo, 1978	9,300- 9,600	4	4	3,900	6,686,400	20.0
		• Cherne, 1982	9,900-10,200	15	15	29,040	28,429,900	27.0
		• Bagre, 1983	8,700- 9,000	5	5	3,050	2,308,400	25.0
		• Parati, 1982	8,900- 9,200	3	3	2,500	4,138,700	25.0
		• Viola, 1981	9,200- 9,900	5	6	8,650	5,528,700	26.0
		• Marimba, 1983	8,900- 9,200	1	1	1,400	1,302,000	28.0
		• Anequim, 1981	8,200- 8,500	3	3	2,980	2,251,700	27.0
		• Area RJS-150	...	...	...	...	296,070	26.0
		• Moreia, 1984	8,200- 9,500	1	6	2,520	25,200	22.0
	RIO GRANDE DO NORTE	Alto do Rodrigues, 1981	990- 1,120	252	273	4,310	4,239,300	18.0
		• Ubarana, 1973	7,216- 8,365	66	89	18,090	40,575,500	40.0
		• Agulha, 1975	5,412	2	3	280	6,793,000	38.0
		Estreito/Rio Panon, 1983	650- 820	379	421	7,190	6,377,900	16.0
		Macau/Terra, 1982	3,000- 3,300	8	12	460	657,500	31.0
		Lorena, 1984	1,200- 1,700	16	16	640	270,500	28.0
		Upanema, 1985	1,110- 1,800	15	24	2,410	949,800	28.0
		• Area 1-RNS-36, 1982	...	...	...	...	178,290	32.0
		• Macau-Mar, 1986	3,000	2	2	22	2,900	31.0
		Faz. Pocinho, 1982	1,450- 2,000	134	137	4,720	5,484,700	35.0
		Palmeiras, 1982	1,450- 1,800	43	44	860	1,471,800	25.0
		Serraria, 1982	3,200- 3,900	33	37	1,600	1,704,500	27.0
		Guamaré, 1983	1,400- 1,600	35	36	790	1,213,900	25.0
		Canto do Amaro, 1986	2,500- 3,600	26	28	980	358,500	25.0
		Livramento, 1986	2,500- 3,300	14	16	1,240	452,900	41.0
		Other	...	42	47	190	346,000	...
	PARÁ	• Área 1-PAS-11, 1983	...	...	...	...	421,317	41.0
	MARANHÃO	São João, 1983	4,950- 6,200	2	3	50	62,900	40.0
	SERGIPE	Atalaia Sul, 1961	1,450	7	7	220	2,641,700	24.0
		Carmopolis, 1963	2,460	695	739	24,020	152,735,200	24.0
		Riachuelo, 1961	1,475	206	235	3,930	19,102,100	28.0
		Siririzinho, 1967	1,640	161	186	6,050	32,298,100	30.0
		• Caioba, 1969	6,232- 6,890	9	10	2,810	28,662,600	36.0
		• Camurim, 1970	6,232	33	39	4,200	13,535,600	25.0
		• Dourado, 1970	3,620- 3,635	3	5	720	3,597,800	36.0
		• Guaricema, 1968	3,335- 4,430	12	12	5,120	33,392,500	41.0
		• Robalo, 1973	3,300- 4,500	4	5	210	767,400	30.0
		Brejo Grande, 1967	1,670	7	7	530	1,509,500	26.0
		Other	...	86	91	1,440	2,987,780	...
		Total Brazil		**4,880**	**5,539**	**573,683**	**2,029,295,478**	
BRUNEI	SHELL	• Fairley, 1969	10,740	39	62	15,100	102,911,000	40.0
		• Ampa SW, 1963	7,068- 8,155	115	260	36,200	499,413,000	41.0
		• Magpie, 1975	NA	13	32	18,890	60,395,000	31.0
		• Champion, 1970	4,300	93	229	44,370	271,295,000	23.0
		Seria, 1928	NA	345	766	27,410	965,905,000	34.0
		Rasau, 1929	NA	4	14	4,080	2,489,000	30.0
		Other	...	...	...	...	12,998,000	...
		Total Brunei		**609**	**1,363**	**146,050**	**1,915,406,000**	
BURMA[c]	MYANMA	Chauk-Lanywa, 1902	1,500- 4,000					36.0
		Mann, 1970	1,600- 7,000					37.5
		Myanaung, 1964	2,000- 4,000	450	450	30,000	482,750,000	40.5
		Prome, 1965	850- 5,000					36.0
		Yenangyaung, 1902	100- 6,700					36.0
		Total Burma		**450**	**450**	**30,000**	**482,750,000**	

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average Bbl	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
CAMEROON	ELF	• Betika, 1972	5,300					42.5
		Ekoundou S., 1975	6,200					24.0
		Kole, 1974	5,500					31.0
		Kombo Center, 1976	5,900					37.0
		Kombo North, 1978	7,200					35.0
		Ekoundou Horst plus Center, 1972	7,200					29.0
		Boa, 1976	5,900					35.0
		Bavo South, 1976	5,600					29.3
		Betika S. Marine, 1979	6,300	166	170	122,040	303,718,000	30.0
		Ekoundou N. Marine, 1977	5,250					36.0
		Mokoko NE plus Abana, 1977	4,600					29.0
		Asoma Marine, 1973	3,600					19.0
		Kita E. Marine, 1978	6,900					40.8
		Mokoko S. Marine, 1977	3,300					17.0
		Inova Marine, 1976	6,200					32.8
	TOTAL-CFP	• Moudi, 1979	5,250- 5,900	5	5	4,900	8,140,000	40.0
		• Moudi D., 1980	3,300	5	5	2,400	1,500,000	21.3
		Total Cameroon		**176**	**180**	**129,340**	**313,358,000**	
CANADA	ALBERTA	Acheson, 1950	3,390	61	118	9,744	115,326,285	38.0
		Bantry, 1940	2,574- 3,300	143	182	6,169	44,111,132	...
		Bellshill Lake, 1955	2,950	377	412	14,124	53,908,502	...
		Bonnie Glen, 1952	3,959- 6,779	130	168	32,398	487,626,329	34.0-44.0
		Carson Creek N., 1958	8,787- 8,935	40	73	8,604	133,309,420	44.0
		Cessford, 1950	2,800- 3,028	177	253	3,143	28,453,842	...
		Clive, 1951	6,074- 6,208	120	168	5,849	47,197,785	...
		Countess, 1951	2,858- 4,272	114	148	7,761	59,001,322	...
		Fenn-Big Valley, 1950	3,900- 5,400	159	326	28,347	305,539,614	32.0
		Gilby, 1962	4,201- 7,000	81	154	3,541	45,286,011	...
		Golden Spike, 1949	3,570- 5,961	65	82	1,855	180,095,652	36.0
		Harmattan East	...	93	150	5,327	69,418,539	...
		Harmatton Elkton, 1955	8,796-10,757	60	73	5,219	58,772,261	...
		Innisfail, 1956	6,730- 8,440	30	76	5,176	71,662,576	...
		Joarcam, 1949	3,179	187	277	5,245	98,295,261	...
		Joffre, 1953	4,983- 6,779	74	169	3,911	80,461,897	...
		Judy Creek, 1951	8,307- 8,701	174	272	19,469	381,361,148	43.0
		Kaybob, 1957	4,870- 9,577	52	87	6,159	98,491,599	...
		Kaybob S., 1958	5,600-10,042	67	101	11,768	72,945,063	...
		Leduc-Woodbend, 1947	3,062- 5,380	335	727	5,179	373,517,714	40.0
		Lloydminster, 1933	1,690- 1,945	410	836	6,009	45,060,726	...
		Medicine River, 1954	5,435- 7,600	241	334	9,927	63,592,600	...
		Mitsue, 1964	5,908	247	364	23,779	261,992,323	43.0
		Nipisi, 1965	5,648- 5,726	227	319	31,948	251,933,799	41.0
		Pembina, 1953	3,000- 6,133	3,219	3,968	87,970	1,170,013,844	32.0-37.0
		Provost, 1946	2,760- 2,898	794	1,185	13,318	63,840,539	...
		Rainbow, 1965	4,994- 6,160	216	301	43,500	479,774,715	38.0-42.0
		Rainbow South, 1965	6,102- 6,400	49	76	6,260	59,498,458	...
		Red Earth, 1956	4,184- 4,878	170	250	5,289	34,221,257	...
		Redwater, 1948	2,012- 3,200	586	848	16,340	778,540,683	35.0
		Simonette, 1958	10,500	30	42	2,152	36,469,700	...
		Snipe Lake, 1962	8,500	47	95	3,405	51,192,499	...
		Sturgeon Lake S., 1953	4,912- 8,471	91	144	14,324	131,173,620	37.0
		Sundre, 1954	8,700- 9,000	50	63	3,092	34,630,294	...
		Swan Hills, 1957	8,100	569	807	44,194	652,310,742	40.0
		Swan Hills S., 1959	8,400	176	200	20,591	331,906,110	...
		Turner Valley, 1913	3,100- 9,150	107	160	2,756	137,957,334	39.0
		Utikuma Lake, 1963	5,624	109	135	11,625	41,752,564	...
		Virginia Hills, 1957	9,210	122	177	12,318	135,776,855	34.0
		Wainwright, 1925	1,903- 2,200	556	749	9,657	62,028,192	...
		Westerose, 1952	6,818	22	34	12,838	120,025,171	...
		Willisden Green, 1956	5,157	560	777	10,111	110,619,218	...
		Wizard Lake, 1951	4,044- 5,973	35	46	19,339	313,199,295	...
		Zama	3,702	120	238	6,336	71,232,773	33.0-37.0
		Other	...	7,610	11,896	309,102	1,370,072,997	...
	BRITISH COLUMBIA	Boundary Lake, 1957	3,418- 4,575	282	339	11,206	163,627,210	40.0
		Other	...	359	808	23,610	243,482,537	...
	MANITOBA	All fields	...	1,367	1,592	14,195	156,366,516	...
	SASKATCHEWAN	Steelman, 1950	4,600	629	693	8,888	248,641,011	...
		Weyburn, 1955	4,600	718	783	12,472	274,403,014	...
		Other	...	11,919	15,858	180,195	1,581,602,140	...
	ONTARIO	All fields	...	1,070	1,285	2,336	60,212,655	...
	NEW BRUNSWICK	All fields	...	...	...	2	799,207	...
	NORTHWEST TERRITORIES	All fields	...	...	...	25,490	43,795,966	...
		Total Canada		**35,246**	**48,418**	**1,193,562**	**12,386,529,516**	

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
CHILE	ENAP-MAINLAND	Canadon, 1962	6,090	13	63	247	14,382,809	38.4
		Daniel, 1960	5,806	10	123	133	34,374,269	25.4
		Daniel Este, 1961	5,523	9	67	395	28,132,817	25.0
		Dungeness, 1962	5,251	3	19	60	3,876,055	28.6
		Posesion, 1960	5,622	36	76	813	20,870,485	63.6
		Other	...	27	116	2,279	21,339,991	...
	TIERRA DEL FUEGO	Calafate, 1955	6,045	13	61	1,232	25,193,443	49.3
		Catalina Sur, 1961	5,779	1	43	3	6,351,315	44.0
		Cullen, 1954	5,730	15	106	416	40,840,764	41.8
		Tres Lagos, 1957	5,724	20	84	439	15,692,645	40.1
		Catalina, 1956	5,756	20	26	3,713	5,551,964	38.7
		Other	...	39	254	1,637	57,246,778	...
	STRAIT OF MAGELLAN	Ostion, 1977	7,156	14	18	1,784	7,188,534	33.0
		Posesion, 1977	6,727	11	39	1,024	4,767,640	34.5
		Spiteful, 1977	6,298	42	82	6,895	39,176,273	34.5
		Spiteful Norte, 1978	7,150	9	58	1,197	8,921,721	39.0
		Daniel Este-Dungeness, 1977	6,126	27	30	2,684	2,277,095	35.9
		Pejerrey, 1984	7,229	38	60	8,485	5,406,984	39.0
		Total Chile		**347**	**1,325**	**33,436**	**341,591,548**	
CHINA[e]	WESTERN REGION: JUNGGAR BASIN, TARIM BASIN, TURPEN BASIN	Karamay, 1955	...	...	...	...	107,622,000	...
		Dushanzi, 1941	...	...	...	...	40,728,000	...
		Other	...	...	...	105,500	420,393,500	...
	CENTRAL REGION: JIUQUAN BASIN	Yumen, 1938	...	...	...	12,700	204,069,500	...
	CENTRAL REGION: SICHUAN BASIN	All fields	...	...	...	2,100	151,300,500	...
	CENTRAL REGION: SHAN-GAN-NING BASIN	Chang Qing, 1978	...	...	...	29,600	73,363,000	...
		Yanchang, 1907	...	...	...	2,500	58,483,500	...
	CENTRAL REGION: QAIDAM BASIN	Qinghai, 1955	...	...	...	2,100	36,646,500	...
		Lenghu 3,4,5, 1958	...	...	...	10,700,000	...	...
		Other	...	...	...	...	52,548,000	...
	EASTERN REGION: SONGLIAO BASIN	Daqing, 1959	...	...	...	1,130,500	5,643,842,500	...
		Fuyn, 1958	...	...	...	12,100	249,122,500	...
		Jilin, 1978	...	...	...	38,500	88,592,500	...
	EASTERN REGION: BOHAI BASIN	Shengli, 1962	...	...	...	630,500	2,152,128,500	...
		Renqiu, 1975	...	...	...	207,500	815,372,500	...
		Liaohe, 1964	...	...	...	190,900	528,714,500	...
		Dagang, 1964	...	...	...	65,000	380,892,000	...
		Zhongyuan, 1981	...	...	...	115,500	153,507,500	...
		Itu, 1970	...	...	...	...	19,600,000	...
	EASTERN REGION: JIANGHAN BASIN	Qianjiang, 1966	...	...	...	...	181,382,000	...
		Other	...	...	...	21,100	112,080,500	...
	EASTERN REGION: NANXIANG BASIN	Nanyang, 1971	...	...	...	46,500	207,637,500	...
	EASTERN REGION: SUBEI BASIN	All fields	...	...	...	7,400	27,856,000	...
		Total China		**34,000**	**NA**	**2,620,000**	**11,716,583,000**	
CHINA, TAIWAN	CHINESE PETROLEUM	Tiechengshan,[c] 1959	...	28	33	1,164	14,750,213	51.0
		Chingtsohu,[c] 1967	...	5	18	212		50.0
		Yunghoshan,[c] 1971	...	25	31	344	6,131,707	45.0
		Chuhuangkeng,[c] 1960	...	23	25	172		50.0
		• CBK, 1986	...	9	9	...	20,440	47.0
		Total China, Taiwan		**90**	**116**	**1,892**	**20,902,360**	
COLOMBIA	ECOPETROL	Galán, 1945	3,200	62	71	1,043	21,084,000	19.0
		Infantas, 1918	3,200	263	307	2,575	223,287,000	25.8
		La Cira, 1925	3,250	612	703	8,600	459,936,000	24.0
		Lis-Nutria, 1957	9,500	130	137	6,479	34,509,000	31.0
		Llanito, 1960	7,300	60	61	5,381	20,351,000	21.0
		Cantagallo, 1941	6,800	11	13	652	18,052,000	19.7
		Casabe, 1941	3,800	330	416	7,482	220,557,000	20.7
		Yarigui, 1954	8,700	58	59	7,794	108,377,000	19.5
		Boquete, 1961	8,000	12	20	427	17,070,000	43.0
		Cicuco, 1956	...	5	22	301	43,287,000	...
		Petrolea, 1933	...	6	21	96	36,851,000	...
		Tibú, 1940	...	189	261	4,876	225,105,000	...
		Ortega, 1951	...	6	6	400	11,328,000	28.0
		Apiay, 1981	10,500	9	22	6,334	8,220,000	23.0
		Orito, 1963	6,600	58	95	10,706	186,054,000	40.0
		Other	...	129	215	7,516	82,652,000	...

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	INTERCOL	Bonanza, 1963	4,000	15	15	921	12,413,000	30.0
		Provincia, 1962	8,000	65	65	15,110	150,692,000	33.0
		Arauca, 1980	18,000	4	4	1,106	3,667,000	41.0
		Other	...	...	...	...	667,000	...
	HOCOL (TENNECO)	Dina K, 1969	6,500	23	32	6,532	23,551,972	22.0
		Dina T, 1962	3,600	47	59	6,080	18,121,570	20.0
		Palogrande, 1971	6,500	22	30	5,556	11,102,790	20.0
		Cebu, 1981	6,500	12	12	2,935	6,114,366	19.0
		Brisas, 1973	4,200	4	6	675	4,203,193	23.5
		Pijao, 1981	7,000	6	7	880	3,215,736	21.0
		Hato Nuevo, 1984	6,900	3	4	867	1,222,517	36.0
		Tello, 1972	7,500	31	33	9,322	36,100,651	22.0
		La Canada, 1966	700	5	7	129	1,002,927	22.0
		San Francisco, 1985	2,800	27	28	10,522	4,994,846	27.0
		Tenay, 1985	11,500	2	2	1,471	607,815	36.3
		Loma Larga, 1985	3,500	1	1	10	8,935	22.4
		La Jagua, 1986	5,300	1	1	211	77,124	22.0
	ELF AQUITAINE	Trinidad, 1974	9,000	2	2	1,808	2,003,092	32.4
		Barquerena, 1982	9,300	2	2	2,267	1,696,799	32.3
		Cano Garza Norte, 1983	7,900	1	1	865	1,074,690	40.2
		Cano Garza, 1979	7,900	2	2	1,235	724,695	40.2
		Tocaria, 1980	13,500	2	2	1,000	345,950	32.1
		Cravo Sur, 1982	10,600	1	1	934	990,400	40.2
		Gloria Norte, 1983	12,100	1	1	867	320,457	17.2
	ARGOSY	Bourdine, 1974	11,000	3	3	871	2,834,000	24.1
		Máxime, 1976	11,000	1	1	...	111,000	26.3
		Nancy, 1974	11,000	1	1	276	1,754,000	25.5
	SHELL	Sta. Rosa, 1984	...	1	1	27	52,492	...
	OCCIDENTAL	Payoa, 1962	8,000	15	39	1,167	68,930,513	27.0
		Salina, 1936	2,500	51	71	3,482	11,391,686	28.0
		Caño Limón, 1984	7,600	6	6	20,756	7,925,762	29.0
		La Yuca, 1984	7,600	16	17	69,806	25,640,437	29.4
		Matanegra, 1984	7,600	6	7	20,093	7,350,397	29.7
	TEXACO	Cocorná, 1963	2,100	48	54	3,317	12,298,122	12.0-13.0
		Palagua, 1956	5,000	107	167	4,248	78,931,000	14.0-17.0
		Tisquirama, 1963	8,000	3	9	469	4,498,018	16.0-28.0
		Velasquez, 1946	7,500	120	302	4,735	163,249,342	19.0-24.0
	TEXACO-ECOPETROL	Teca, 1981	2,100	143	148	15,023	14,624,489	12.0-13.0
		Other	...	11	41	607	4,608,118	11.2-26.1
	CHEVRON	Rio Zulia, 1961	5,700	...	24	1,433	126,986,934	41.0
		Castilla, 1969	6,500	16	18	10,219	16,288,686	13.5
		Chichimene, 1969	6,500	1	1	490	190,394	21.3
	LASMO	Santiago, 1985	9,600	2	2	1,100	263,000	29.0
		Total Colombia		**2,770**	**3,658**	**300,084**	**2,550,197,915**	
CONGO[e]	AGIP-ELF	• Loango, 1972	3,000	49	52			26.8
	ELF CONGO	• Emeraude, 1969	820	113	113			21.8
		• Likouala, 1979	4,270	28	28			33.1
		• Yanga, 1979	2,950	47	47			29.4
		• Sendji, 1973	3,940	41	41	114,266	361,968,000	30.1
		Pointe Indienne, 1951	5,000	3	3			36.9
		Mengo, 1979	6,500	3	3			34.0
		Kundsi, 1980	4,000	2	2			35.8
		Total Congo		**286**	**289**	**114,266**	**361,968,000**	
DENMARK	DUC	• Dan, 1971	6,000- 6,400	...	...	8,023	30,833,168	30.7
		• Gorm, 1971	6,500- 7,000	...	...	29,569	57,612,039	34.7
		• Skjold, 1977	5,000	...	...	18,496	18,876,358	29.6
		• Rolf, 1981	...	...	...	8,085	2,948,748	37.7
		• Tyra,[c] 1986	...	...	...	9,751	6,209,509	56.6
		Total Denmark		...	...	**73,924**	**118,479,822**	
DUBAI	DUPETCO[e]	• Fateh, 1966	7,900- 9,000					31.8
		• S.W. Fateh, 1970	7,500- 9,000					30.3
		• Falah, 1972	8,100	141	156	314,760	1,767,685,000	25.5
		• Rashid, 1973	9,400-11,500					38.0
	ARCO	Margham, 1981	11,200	9	14	19,490	17,266,000	43.5
		Total Dubai		**150**	**170**	**334,250**	**1,784,951,000**	

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
ECUADOR	TEXACO	Lago Agrio, 1967	10,175	17	34	8,216	106,194,241	28.5
		Sacha, 1969	10,160	88	106	61,577	325,283,446	28.0
		Shushufindi, 1959	9,772	47	67	110,486	470,524,403	30.0
		Aguarico, 1968	9,850	4	10	6,305	41,153,480	27.2
		Auca, 1970	10,578	16	24	17,098	61,641,497	28.0
		Auca Sur-1, 1980	10,578	2	2	782	972,888	28.0
		Atacapi, 1968	9,855	3	5	1,964	11,285,030	31.0
		Parahuacu, 1968	10,173	2	5	485	5,853,014	30.0
		Yuca, 1970	10,423	5	12	3,809	9,475,121	28.0
		Yuca Sur-1, 1979	10,423	1	1	288	854,864	28.0
		Yulebra, 1980	10,345	2	2	1,461	1,841,319	21.4
		Culebra, 1973	10,626	1	1	686	1,554,520	17.5
		Cononaco, 1972	11,233	10	12	18,321	17,768,821	33.3
		Dureno, 1986	10,290	1	1	595	530,123	31.0
		Guanta, 1986	9,575	3	3	1,586	578,773	29.7
		Rumiyacu, 1982	10,191	1	1	...	184,939	21.0
	CLYDE PETROLEUM	Mariann, 1971	7,000	5	5	1,016	3,348,617	20.0
		Fanny, 1972	7,700	7	8	3,719	8,352,469	22.5
		Tarapoa, 1973	8,300	2	2	321	842,110	20.0
	CEPE-ORIENTE[a]	Shushuqui, 1980	9,200	6	6			28.8
		Shuara, 1980	9,100	8	8			29.6
		Secoya, 1980	9,100	15	15			30.3
		Charaoa, 1967	10,000	12	12	48,284	164,230,800	30.0
		Cuyabeno, 1972	8,050	4	4			28.8
		Sansahuari, 1979	8,100	1	1			28.8
		Tetete, 1980	9,300	5	5			28.0
		Bermejo, 1967	5,000	9	9			34.0
	CEPE-PENINSULA[a]	Ancon, 1921	4,000	475	475			35.6
		Carpet	...	70	70			...
		Cautivo	...	100	100			...
		Total Ecuador		**922**	**1,006**	**287,000**	**1,232,470,454**	
EGYPT	GUPCO/AMOCO	• El Morgan, 1965	5,100- 6,400	88	106	115,748	967,000,000	27.0-32.0
		• July, 1973	8,100-10,000	33	41	68,338	422,200,000	31.0-34.6
		• Ramadan, 1974	11,300	19	25	47,719	346,500,000	31.7
		• October, 1978	11,000	20	27	116,112	253,900,000	28.0
		• Shoab Ali, 1978	5,500	19	50	17,670	120,600,000	30.0
		• SG-300, 1976	5,876	1	2	5,117	16,900,000	24.8
		• Sidki (382), 1977	10,500	5	7	7,570	35,400,000	33.9
		• GS (365) 1980	10,140	...	1	...	490,000	32.0
		• GS (277), 1980	8,610	...	1	1,502	1,900,000	34.0
		• SB (305), 1981	8,100	1	1	610	1,800,000	30.0
		• Badri (315), 1981	6,400	20	30	19,586	28,500,000	27.0
		• Younis (347), 1981	4,300	4	5	4,218	9,500,000	32.0
		• GH (376), 1981	8,600	2	4	2,392	4,600,000	25.0
		• SB (339), 1981	4,600	1	1	296	340,000	29.5
		• Nessim (336), 1981	6,700	2	3	1,867	8,400,000	26.9
		• Hilal (404), 1982	9,200-10,000	4	6	29,317	25,700,000	32.0
		• Waly (356), 1982	6,900	1	3	555	2,600,000	35.0
		• GS (345/346), 1982	7,500	...	2	561	1,100,000	38.0
		• SB (367), 1984	7,000	1	1	1,786	1,020,000	38.0
		• GS (381), 1985	8,700	...	1	2,307	920,000	37.0
		Abu Gharadig, 1972	9,500	15	24	10,725	46,000,000	36.0
		WD-33, 1972	9,800-10,800	...	1	39	2,100,000	32.0
		Razzak and E. Razzak, 1972	7,000	10	15	3,546	49,700,000	36.0
		• GS-327, 1983	5,600	1	1	772	280,000	20.0
		• SB-294, 1986	11,600	1	1	746	290,000	30.5
		NAG-9/9-1, 1985	10,000	2	2	828	510,000	35.0
		NEAG-9/15, 1984	10,635-12,128	...	3	357	130,000	35.0
		WD-33/15, 1985	5,800	1	1	8	2,000	30.0
	PETROBEL[a]	Belayim Onshore, 1954	7,000- 8,500	34	55	44,163	411,899,082	22.5
		• Belayim Marine, 1961	8,500	94	110	120,388	509,891,833	29.5
	WEPCO/PHILLIPS PETROLEUM	El Alamein, 1966	8,700	17	19	2,028	65,517,658	33.6
		Umbarka, 1976	10,700	5	5	2,510	4,771,566	43.9
		Yidma, 1971	9,000	3	5	1,252	21,389,262	44.0
	EGPC[a]	Gharib, 1938	2,200- 4,500	81	215	4,465	246,492,293	24.3
		Bakr/W. Bakr, 1958/1978	3,200- 1,500	48	83	3,657	75,561,079	18.0-19.0
		Umel Yusr, 1963	3,000- 3,300	19	37	2,768	33,122,888	21.5
		Amer, 1965	3,500	21	39	3,515	11,759,452	21.5
		El Ayoun, 1968	3,300	5	12	343	6,109,210	22.0
		Kareem, 1958	2,300	6	35	364	10,888,670	16.6
		Kheir, 1973	1,050	1	4	61	1,017,853	28.5
		Shukheir, 1966	2,500	5	11	586	2,988,681	34.0
		Ras El Behar, 1983	4,500	6	11	7,536	11,129,470	32.5
		Esh Elmalaha	3,700	2	2	162	92,465	44.0
		Sudr, 1946	2,600	12	20	1,333	49,062,901	21.6
		Asl, 1947	3,000	3	6	950	41,222,383	21.6

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
		Matarma, 1948	2,000	2	2	141	1,793,785	14.6
		El Khaligue, 1980	1,600	...	1	...	188,760	29.4
		Abu Senan T&Y, 1981	6,000	12	20	2,000	2,536,085	...
		Harghada, 1913	...	NA	NA	81	29,565	...
	SUCO	• Ras Budran, 1978	11,400	16	16	41,698	44,041,848	25.0
		• LL 87-2, 1975	11,000	...	1	40	771,246	35.0
		• Ras Fanar, 1978	2,300	6	6	10,788	13,565,346	35.0
		• Zeit Bay, 1981	4,200	22	22	60,669	54,180,124	33.0
	OSOCO/TOTAL	• Shukheir Bay, 1978	6,300	1	1	538	1,746,299	34.5
		• S. Ramadan, 1982	10,000	2	2	771	399,507	36.5
	EPEDECO	West Bakr, 1978	1,300- 1,500	20	25	4,849	10,022,835	18.0
	BADR PETROLEUM/SHELL	Badr el din, 1982	10,800	6	6	11,120	11,759,000	38.0
	EGYPTCO	Meleha, 1972	6,000	12	12	1,354	687,371	40.0
	GEYSUM	• Geysum, 1980	5,500	5	5	4,808	2,095,688	17.0
	SUESSO (ESSO)	• East Zeit, 1982	11,000	4	4	3,277	1,196,000	38.0
	SHUKAIR MARINE CO.	O. Suco	...	1	1	525	1,673,898	...
	EL ALAMEIN	Mors	...	1	1	283	103,236	...
	KHALDA	Salam	...	1	1	61	22,122	...
		Total Egypt		**724**	**1,160**	**799,376**	**3,998,111,461**	
FRANCE	ALSACE	All fields	...	14	28	473	2,829,443	...
		Abandoned	...	...	...	...	24,310,359	...
	AQUITAINE BASIN	Lacq Superieur, 1949	2,170	40	57	977	25,233,562	22.3
		Parentis, 1954	7,710	61	73	6,492	194,088,976	33.4
		Lugos, 1956	5,250	19	25	822	9,666,101	20.8
		Cazaux, 1959	7,550	36	45	5,083	66,180,650	34.2-37.0
		Lavergne, 1962	11,480	4	4	407	12,004,302	41.7
		Pecorade, 1974	10,660	10	14	2,658	8,140,273	29.3
		Castéra-Lou, 1976	9,600	8	9	655	2,174,566	21.7
		Vic Bilh, 1979	7,100	24	39	5,644	12,634,755	26.6
		Lagrave, 1984	6,500	3	3	3,559	2,545,890	42.5
		Other	...	8	29	540	18,920,333	...
		Abandoned	...	...	...	...	70,857	...
	PARIS BASIN	Blandy, 1984	7,410	1	3	397	478,065	36.0
		Coulommes, 1958	6,230	34	48	460	13,070,626	32.6
		Châteaurenard, 1958	1,800	22	42	396	4,604,978	27.5
		St. Martin, 1959	4,590	11	15	341	8,234,164	33.0
		Villeperdue, 1959	6,100	75	95	9,526	6,108,049	34.4
		St. Firmin, 1960	1,800	35	58	606	9,612,284	27.5
		Chuelles, 1961	1,800	36	57	571	6,691,654	27.5
		Soudron, 1976	4,600	20	27	503	1,752,898	34.4
		Donnemarie, 1979	8,040	2	3	851	1,536,144	36.2
		Chaunoy, 1983	7,350	38	43	13,294	10,386,281	37.1
		St. Germain, 1984	7,200	8	9	1,965	1,030,629	36.0
		Other	...	74	186	3,021	24,014,006	...
		Abandoned	...	...	...	294,385	...	
	SOUTHEAST + JURA	All fields abandoned	...	...	...	...	223,063	...
		Total France		**583**	**912**	**59,241**	**466,847,293**	
GABON	ELF	• Anguille, 1962	9,200					31.2
		• Anguille NE, 1968	7,500					32.0
		• Anguille NNE, 1971	7,500					32.0
		• Barbier, 1972	6,000					29.5
		• Breme, 1976	5,000					36.5
		Clairette, 1956	4,400					29.0
		• Girelle, 1973	9,400					32.0
		• Gonelle, 1972	5,800					24.2
		• Grondin, 1971	7,500					16.4
		• Mandaros, 1972	4,900					19.8
		Olende, 1976	6,700					33.8
		• P.G.S. Marine, 1975	7,500	214	330	124,298	865,478,000	32.5
		• Port Gentil Ocean, 1964	6,500					33.0
		Tchengue, 1957	4,100					26.8
		• Torpille, 1968	8,200					35.8
		• Baliste, 1974	4,900					28.3
		• M'Bya Sud, 1969	6,700					35.4
		• Anguille SE, 1962	8,200					32.8
		• Ayol Marine, 1979	7,700					22.8
		• Baudroie N., 1980	7,500					34.5
		• Baudroie Marine, 1968	7,500					33.3
		Other	...					...

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	SHELL GABON	Gamba/Ivinga, 1963	3,000- 3,100	53	68	12,650	249,717,000	31.6
		Lucina-Marine, 1971	5,900	15	16	11,370	44,750,000	38.4
		Lucina-Marine W., 1982	...	...	...	1,410	1,215,000	37.0
	AMOCO	Oguendjo B and C, 1981	5,000- 6,000	13	14	11,292	18,100,000	35.0
		Total Gabon		**295**	**428**	**161,020**	**1,179,260,000**	
GHANA[e]	AGRI-PETCO	• Saltpond, 1977	8,500	...	3	...	3,938,000	36.0-39.0
		Total Ghana		...	**3**	...	**3,938,000**	
GREECE	N. AEGEAN PET. CORP.	• Prinos, 1974	8,000- 8,800	16	16	26,500	44,112,706	30.6
		Total Greece		**16**	**16**	**26,500**	**44,112,706**	
GUATEMALA[e]	MEM	Rubelsanto, 1974	5,300- 7,000	5	5			26.0-30.0
		West Chinaja, 1977	3,200- 3,800	3	3			35.0-43.0
		Caribe, 1981	6,830- 7,280	3	3	4,962	13,477,000	22.0-24.0
		Tortugas	2,300	...	2			35.0
		Tierra Blanca	11,230	...	1			19.5
		San Diego, 1981	17,150	1	1			34.7
		Total Guatemala		**12**	**15**	**4,962**	**13,477,000**	
INDIA	GUJARAT STATE	Ankleshwar, 1960	2,953- 3,937					
		Bakrol, 1968	4,593- 4,921					
		Kadi, N., 1968	2,953- 3,909					
		Kadi, S., 1968	5,906- 6,562					
		Kalol, 1961	4,265- 5,250					
		Kathana, 1965	5,250- 5,906					
		Kholka, 1966	4,265- 5,577					
		Kosamba, 1963	1,968- 2,625					
		Nawagam, 1963	4,429- 6,652					
		Sanand, 1963	4,265- 4,593					
		Sobhasen, 1968	4,429- 5,906					
		Wovel, 1963	4,265- 4,593					
				2,670	3,413	634,356	1,779,878,489	
	ASSAM STATE	Digboi, 1890	300- 7,500					
		Geleki, 1968	12,632-12,795					
		Lakwa, 1965	8,038-12,795					
		Moran, 1958	11,000					
		Nahorkatiya, 1953	9,500					
		Rudrasagar, 1961	10,171-10,500					
	MAHARASHTRA STATE	Bombay High, 1974	4,530- 4,630					
		Total India		**2,670**	**3,413**	**634,356**	**1,779,878,489**	
INDONESIA	PERTAMINA UEP I[e]	Besitang, 1977	3,973					51.5
		Gebang, 1977	2,917					54.0
		K. Simpang, 1971	3,740- 5,019					45.0
		P. Tabuhan, 1937	3,350- 5,893	204	226			50.8
		Rantau, 1929	2,764					45.3
		Serang Jaya, 1926	3,701					47.5
		Other	...					...
	PERTAMINA UEP II[e]	Benuang, 1942	6,103					35.1
		Benakat East, 1973	NA					NA
		Tempino, 1931	1,647					23.0
		Gn. Kemala, 1938	5,448					38.0
		Limau, 1928	3,896- 4,626					NA
		Ogan Timur, 1943	3,793					27.42
		Talang Jimar, 1937	4,123	412	1,419			31.0
		T. Miring, 1935	640					NA
		Tanjung Tiga, 1938	3 750					28.0
		Kenali Asam, 1931	2,077					29.0
		Belimbing	5,371					...
		Kuang, 1940	5,249					25.1
		Other	...					...
	PERTAMINA UEP III[e]	Cemara, 1976	3,964- 7,104					...
		Jatibarang, 1969	3,063	88	184			29.0
		Tugu Barat, 1979	3,014					...
		Other	...					...
	PERTAMINA UEP IV[e]	Bunyu, 1923	2,077					33.2
		Sangatta, 1939	1,842					33.0
		Tanjung, 1938	2,296	161	334			39.9
		Tapian Timur, 1967	4,396					38.8

WORLDWIDE PRODUCTION

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	Warukin S., 1966	2,067					26.9
	Other	...					...
PERTAMINA UEP V[e]	Klamono, 1936	574					19.0
	Linda, 1977	3,281	47	55			19.0
	Sele, 1951	2,156					35.0
PERTAMINA (FROM STANVAC)[e]	Sago, 1940	1,800					34.0
	Lirik, 1939	1,600					34.0
	Molek, 1956	2,600					34.0
	N. Pulai, 1941	1,800					34.0
	S. Pulai, 1941	1,800	354	354			34.0
	Talang Akar, 1922	2,800					35.0
	Benakat, 1932	1,600					35.0
	Jirah, 1930	2,300					35.0
	Rajah, 1940	6,000					38.0
	Abab, 1951	6,000			107,688	2,579,576,000	36.0
PERTAMINA (N.E. KALIMANTAN)[e]	Sembakung, 1976	2,600	17	19			36.0
	Bangkudulis, 1980	3,250	...	1			39.5
PHILLIPS GROUP[e]	Salawati, 1976	5,749	7	13			39.2
AARNL[e]	Bula	280- 700	49	106			22.5
LEMIGAS[e]	All fields, 1893-1909	2,155- 2,297	71	419			...
CAL ASIATIC TOPCO	Batang, 1975	690	7	10			19.2
	Buaya, 1978	2,035	1	1			28.0
	Lindai, 1971	1,100	14	16			30.7
	Menggala S., 1968	3,765	1	1			33.5
	Tanjung Medan, 1976	2,770	2	7			37.6
	Benua, 1978	2,400	14	17			41.4
	Beruk, 1974	1,750	19	23			38.0
	Bungsu, 1976	2,050	7	8			38.4
	Damar, 1974	4,650	5	6			33.5
	Dusun, 1979	2,550	5	6			42.3
	Gatam, 1977	2,385	2	2			33.5
	Kasikan, 1972	660	18	24			27.3
	Beruk NE, 1976	1,800	3	5			40.0
	Osam, 1978	900	5	5			31.8
	Paitan, 1978	2,315	1	1			31.6
	Pedada, 1973	950	26	27			33.1
	Pusaka, 1977	2,250	17	21			34.6
	Sabak, 1974	2,350	13	13			35.8
	Terantam, 1973	900	4	4			31.7
	Zamrud, 1975	3,600	42	46			40.3
	Langgak, 1976	1,380	18	20			31.7
ASAMERA (NORTH SUMATRA)[e]	Geudondong, 1965	3,192	...	23			53.1
	Julu Rayeu, 1968	2,832	10	36			53.6
	Ilee Tabeu, 1971	2,721	4	47			50.3
	Alur Cimon, 1972	3,098	..	24			50.8
	Tualang, 1973	2,631	14	53			49.9
	Peudawa, 1980	3,083	..	12			48.1
	Other	...	...	11			...
ASAMERA (SOUTH SUMATRA)[e]	Kluang, 1913	2,591	32	74			42.6
	Mangunjaya, 1934	2,700	8	99			32.0
	Tanjung Laban, 1982	3,590	10	14			38.1
	Ramba, 1982	3,150	47	60			37.0
	Rawa, 1985	4,038	1	13			38.7
	Other	...	...	7			...
	Tempino, 1931	4,493	3	9			40.9
	Bentayan, 1932	4,446	5	8			22.0
	Panerokan, 1976	4,915	3	5			39.4
BAPCO	• Cinta, 1970	3,500	37	46	15,214	166,355,000	34.0
	• Gita, 1972	5,000	6	9	1,027	6,939,000	34.5
	• Kitty, 1973	2,700	6	7	1,014	13,212,000	18.0
	• Nora, 1973	3,200	3	5	427	8,513,000	29.0
	• Rama, 1974	3,200	44	75	8,260	86,205,000	31.0
	• Selatan, 1971	4,000	9	19	1,718	19,883,000	19.5
	• Zelda, 1971	7,500	31	43	9,282	32,132,000	33.0
	• Krisna, 1979	4,500	29	41	8,556	54,258,000	37.0
	• Yvonne, 1980	4,500	9	11	6,608	9,699,000	36.0
	• Farida, 1982	8,000	14	22	2,373	9,526,000	32.0
	• Titi, 1982	8,000	...	4	...	1,654,000	33.0
	• Sundari, 1982	4,400	12	15	3,622	8,520,000	25.0
	• Duma, 1983	2,300	3	6	737	589,000	16.0
	• Karmila, 1983	4,800	7	9	16,370	21,978,000	36.0
	Wanda, 1984	4,800	2	5	1,159	1,466,000	36.0
PETROMER TREND	Canderawasih, 1976	3,500	9	14	1,199	11,234,294	27.8
	Jaya, 1973	3,050	13	17	2,415	34,715,067	42.0
	Kasim, 1972	3,350	33	40	4,832	44,026,032	38.0
	Walio, 1975	2,750	218	237	18,786	140,256,771	34.2
	Other	...	9	19	555	11,194,940	...

WORLDWIDE PRODUCTION

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 - Bbl	°API gravity
CALTEX	Aman, 1974	4,700	10	10	3,385		42.1
	Anatara, 1978	1,425	5	5	1,016		35.7
	Balam SE, 1972	4,500	13	13	545		29.6
	Balam S., 1969	1,600	48	48	9,909		33.3
	Bangko, 1970	1,950	70	79	30,397		33.8
	Batang CPI, 1975	690	5	7	227		18.8
	Bekasap, 1955	2,950	49	60	17,505		33.4
	Bekasap S., 1968	3,900	8	11	1,052		34.1
	Benar, 1973	2,450	25	26	5,296		32.9
	Cebakan, 1974	4,700	4	4	715		30.1
	Garuk, 1980	4,600	2	2	37		30.6
	Hitam, 1975	6,690	4	5	1,358		38.7
	Intan, 1977	3,350	6	6	1,091		32.8
	Jorang, 1972	5,500	13	15	8,101		38.2
	Kerang, 1977	3,900	11	13	1,406		37.3
	Kopar, 1974	5,300	12	18	1,757		37.1
	Kotabatak, 1952	5,500	65	113	21,371		28.9
	Libo, 1968	6,000	8	10	1,328		34.3
	Libo SE, 1973	5,900	23	27	11,385		42.0
	Lincak, 1981	2,570	4	4	914	5,831,920,956	35.2
	Menggala N., 1968	3,850	14	17	4,905		32.5
	Menggala S. CPI, 1968	3,765	7	8	2,110		33.5
	Minas, 1944	2,600	421	553	254,314		34.7
	Mindal, 1971	3,400	2	3	116		36.0
	Mutiara, 1976	3,500	2	2	106		34.1
	Nella, 1977	5,000	3	3	179		34.7
	Obor, 1978	7,370	1	1	174		39.9
	Pager, 1974	4,300	23	25	7,531		37.3
	Pelita, 1977	6,600	5	5	799		38.4
	Pematang, 1959	3,750	36	43	8,310		31.6
	Pematang Bow, 1969	5,300	4	8	1,162		34.8
	Pemburu, 1981	2,300	8	9	3,782		35.3
	Perkebunan, 1977	2,300	1	1	21		29.4
	Petani, 1964	4,750	32	34	11,548		32.8
	Petapahan, 1971	4,500	21	26	5,846		27.9
	Pinang, 1971	3,950	19	20	3,318		32.4
	Pinggir, 1972	3,300	5	6	264		34.7
	Pinggir S., 1973	3,300	2	2	64		38.5
	Pudu, 1972	5,950	6	12	1,517		36.1
	Puncak, 1979	2,400	12	12	4,569		35.3
	Pungut, 1951	3,400	27	27	5,594		37.7
	Rangau, 1968	6,100	3	10	158		42.0
	Rantaubais, 1972	1,070	14	16	377		21.0
	Rokiri, 1979	6,100	...	2	...		41.3
	Seruni, 1972	3,000	22	23	3,653		35.7
	Sikladi, 1975	4,340	18	18	2,301		38.2
	Singa, 1977	3,200	1	1	46		31.0
	Sintong, 1971	3,400	19	19	2,419		32.2
	Sintong SE, 1973	4,500	1	1	20		36.1
	Suram, 1971	1,750	3	6	235		27.6
	Topaz, 1977	5,200	7	7	2,273		33.0
	Topi, 1979	3,630	1	1	63		36.7
	Tandun, 1969	3,000	9	9	816		34.3
	Telinga, 1975	4,205	7	8	800		33.6
	Tunas, 1983	4,819	2	2	166		35.0
	Ubi, 1976	4,350	20	21	1,609		35.8
	Waduk, 1982	6,100	10	11	891		37.6
	Duri, 1941	770	1,012	1,228	69,339		21.4
	Kulin, 1970	2,050	55	61	4,223		20.0
STANVAC (CENTRAL SUMATRA)	Binio, 1972	1,600	22	22	550	11,506,000	34.0
	Pekan, 1976	3,700	22	22	1,000	7,284,000	35.0
	Merbau, 1979	2,700	23	29	1,790	5,860,000	36.0
	Kerumutan, 1980	3,000	21	26	1,262	4,287,000	35.0
	N. Merbau, 1980	2,600	8	17	663	2,651,000	36.0
	Panduk, 1981	2,500	6	6	272	1,237,000	46.0
	Kayuara, 1982	3,700	7	9	575	1,426,000	35.0
	Gemuruh, 1983	2,800	17	19	1,975	1,081,000	34.0
	E. Kayuara, 1983	3,500	47	51	5,500	2,546,000	35.0
	Mutiara, 1985	2,700	2	2	91	807,000	34.0
	Other	4,600	...	...	...	9,175	...
STANVAC (SOUTH SUMATRA)	Ibul, 1970	5,700	11	16	1,270	21,390,000	36.0
	Rambutan, 1972	4,500	2	3	160	3,197,000	42.0
	Tabuan (PSC)	4,000	...	...	...	419,610	34.0
	Other	4,500	...	...	...	797,023	...
ARCO	Ardjuna, 1969	2,380- 7,250	266	330	136,930	599,181,000	37.0
	Arimbi, 1972	2,943	10	12	2,580	21,725,000	33.0
ROY M. HUFFINGTON INC.	Badak, 1972	5,190-10,600	44	52	6,020	35,978,627	32.0
	Nilam, 1974	7,500-11,500	35	39	7,363	16,393,901	32.0

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
		Pamaguan, 1974	900- 5,100	14	27	2,343	5,170,144	30.0
		Mutiara, 1984	900- 5,800	12	19	2,740	2,005,815	30.0
		Semberah, 1974	2,900-10,100	...	16	...	7,054	35.0
	TOTAL CFP	• Tambora, 1984	8,000-13,000	15	34	6,000	4,182,000	33.0
		• Handil, 1974	2,900- 9,200	190	258	130,000	575,339,000	33.0
		• Bekapai, 1972	4,600- 5,600	38	41	15,300	146,281,000	40.0
	UNOCAL	• Attaka, 1970	7,500	71	81	48,051	415,942,873	39.0
		• Melahin, 1972	7,500	6	6	790	5,892,312	23.1
		• Kerindingan, 1972	7,000	4	8	353	5,031,150	23.8
		• Sepinggan, 1973	11,150	13	17	6,224	39,437,356	34.0
		• Yakin, 1976	5,100	24	28	11,788	15,027,171	18.8
		• Rajah, 1981	5,500	3	3	1,870	2,984,559	33.8
	CONOCO GROUP	• Udang, 1974	5,595	22	28	9,098	52,164,000	40.0
		• Kepeting, 1982	6,000	2	2	657	156,000	37.0
	MOBIL OIL	Arun, 1971	10,050	34	50	102,140	253,176,562	55.0
	TESORO INDONESIA PETROLEUM	Samboja, 1909	360- 4,380	27	126	557	64,209,830	21.0
		Sanga Sanga, 1897	275- 6,000	109	239	3,329	265,558,113	32.0
		Tarakan, 1906	200- 6,540	131	1,165	1,855	209,519,669	20.0
	MARATHON	• Kakap KH, 1980	8,500	11	12	9,449	3,449,000	45.0
		Total Indonesia		**5,774**	**10,084**	**1,256,800**	**11,897,172,004**	
IRAN[e]	NIOC	Agha Jari, 1936	7,440	58	89			34.0
		Ahwaz Asmari, 1958	8,150	73	85			32.0
		Ahwaz Bangestan, 1958	12,000	...	7			24.3
		Bibi Hakimeh, 1961	4,570	19	33			29.9
		Binak, 1959	10,440	...	4			29.9
		Chillingar, 1974	3,350	...	1			39.3
		Chesmeh Khush, 1967	10,700	...	4			27.7
		Dehluran, 1972	11,900	...	6			31.0
		Gachsaran, 1937	3,400	46	62			31.0
		Haft Kel, 1927	1,980	2	11			37.7
		Karanj, 1963	5,360	7	7			33.9
		Kharg, 1961	10,900	...	...			31.6
		Kupal, 1965	10,500	...	7			32.8
		Lab-e Safid, 1968	4,350	...	7			35.3
		Mansuri, 1963	7,100	4	8			28.4
		Marun, 1963	9,400	55	112			32.6
		Masjid-e Suleiman, 1908	1,600	7	24			39.3
		Naft Safid, 1938	5,000	5	19	1,848,000	35,009,515,000	36.8
		Paris, 1964	4,670	22	27			38.8
		Par-e Siah, 1964	4,250	...	1			37.7
		Pazanan, 1961	7,250	44	71			37.2
		Rag-e-Safid, 1964	7,230	19	29			28.6
		Ramin, 1966	12,200	...	...			32.9
		Ramshir, 1962	8,750	...	3			27.6
		Sulabedar, 1971	3,400	...	1			30.4
		Naft-e Shah, 1923	2,000- 3,000	...	...			43.0
		• Bahregansar, 1960	9,000	...	...			30.0
		• Hendijan, 1968	11,000	...	...			23.0
		• Nowruz, 1966	8,200	...	...			21.0
		• Rakhsh, 1969	7,650	...	...			35.8
		• Rostam, 1966	7,000	...	...			34.4
		• Ardeshir, 1969	2,800	...	...			27.0
		• Cyrus, 1962	7,000	...	...			18.3
		• Darius, 1961	11,000	...	...			34.0
		• Fereidoon, 1966	7,000	...	...			28.5
		• Sassan, 1965	7,500- 8,100	...	...			34.0
		Total Iran		**361**	**618**	**1,848,000**	**35,009,515,000**	
IRAQ[e]	INOC	Ain Zalah, 1939	5,200- 6,500	8	28			31.0
		Bai Hassan, 1953	4,800- 5,400	62	77			34.0
		Butmah, 1953	3,900	7	17			31.0
		Hamrin, 1973	2,000	...	...			...
		Jambur, 1954	5,500-12,500	36	52			38.0
		Kirkuk, 1927	2,800- 4,200	59	226			36.0
		Naft Khaneh, 1909	3,500	...	...			42.5
		Rumaila North, 1958	10,300	205	324	1,690,000	18,137,044,000	33.0
		Rumaila South, 1953	10,200	117	192			34.0
		Zubair, 1949	10,200	48	84			35.0
		Abu Ghurab, 1971	9,800	...	...			24.0
		Buzurgan, 1970	12,000	19	22			24.0
		Jabal Fauqui, 1974	10,000	...	...			25.5
		Luhais, 1961	8,200	16	20			33.0
		Walyanah, 1929	650	38	87			16.0
		East Baghad, 1975	6,000- 7,000	...	...			16.0
		Total Iraq		**615**	**1,129**	**1,690,000**	**18,137,044,000**	

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
ISRAEL[e]	LAPIDOTH	Heletz-Brur, 1955	5,200	4	4			29.2
		Kochav, 1962	5,500	2	2			27.9
	OEIL	Ashdod, 1976	8,400	2	2	1,000	20,545,400	32.5
	EMOG	Gurim, 1984	3,280	1	1			17.0
		Total Israel		**9**	**9**	**1,000**	**20,545,400**	
ITALY	AGIP[e]	Cavone, 1979	10,663-18,068	16	20			24.0
		Malossa, 1973	17,881-21,231	4	10			55.0
		Pisticci-S. Cataldo, 1960	6,820- 6,880	11	14			11.4
		Gela, 1956	11,280-11,350	63	72			10.0
		Perla	7,850	8	8			13.3
		Cela Mare	10,300	11	18			10.0
		Ragusa, 1954	5,760	60	70	39,600	311,030,400	...
		Nilde, 1977	4,545	1	2			38.9
		S. Maria	...	6	6			15.9
		Emilio S	9,215	1	1			13.0
		Narciso	2,650	1	1			21.1
		Varius	...	18	56			...
		Other	...	16	65			2.8-55.9
	ELF	• Santa Maria a Mare, 1974	7,900	10	10	1,600		23.0
		• Rospo Mare, 1975	4,600	9	9	2,500	21,717,300	11.0
		• Sarago Mare, 1979	5,200	4	4	5,300		8.0
		Total Italy		**239**	**366**	**49,000**	**332,747,700**	
IVORY COAST	ESSO COTE D'IVOIRE	• Belier, 1975	6,500	8	12	3,343	15,520,000	...
	PHILLIPS-AGIP-SEDCO-PETROCI	• Espoir, 1980	6,500-11,000	6	8	14,024	23,710,765	32.3
		Total Ivory Coast		**14**	**20**	**17,367**	**39,230,765**	
JAPAN	JAPEX	• Aga-Oki, 1972	7,590	7	7	1,308	5,013,732	24.8
		Higashi-Niigata, 1965	4,500- 9,200	18	28	1,055	8,263,898	53.9
		Sarukawa, 1958	2,000- 3,200	62	134	1,302	16,053,540	32.3
		Yoshii, 1968	8,000	9	25	721	8,419,179	61.8
		Yurihara, 1976	1,310- 7,610	9	14	277	187,192	43.5
		Katakai, 1960	3,310-16,300	5	16	264	293,782	50.0
		Other	...	56	77	531	21,966,231	...
	IDEMITSU OIL DEVELOPMENT CO. LTD.	• Agaoki-Kita, 1982	4,950	10	10	3,989	2,391,824	33.0
	TEIKOKU OIL	Yabase, 1933	1,100- 5,800	61	73	342	32,914,927	33.0
		Minami-Aga, 1964	7,300- 9,600	10	26	511	13,463,289	38.5
		Minami-Nagaoka, 1984	13,200-15,100	5	11	620	516,443	55.7
		Hagashi-Kashiwazaki, 1970	6,000- 8,900	6	13	570	7,726,366	62.0
		Kubiki, 1959	1,100- 6,400	94	125	658	12,718,584	29.7
		Other	...	35	47	173	5,241,383	...
		Total Japan		**387**	**606**	**12,321**	**135,170,360**	
JORDAN[e]	NRA	Hamzah, 1984	...	...	...	4,000	1,460,000	30.0
		Total Jordan		**...**	**...**	**4,000**	**1,460,000**	
KUWAIT[e]	KOC	Burgan, 1938	4,800	210	393			30.8
		Ahmadi, 1952	4,800	11	84			31.7
		Magwa, 1951	4,800	71	113			33.0
		Raudhatain, 1955	8,600	41	53			34.4
		Bahra, 1956	8,500	...	2	1,244,000	22,240,468,000	...
		Sabriya, 1957	8,300	9	44			36.3
		Minagish, 1959	10,000	1	21			34.4
		Umm Gudair, 1962	9,000	20	33			26.9
		Total Kuwait		**363**	**743**	**1,244,000**	**22,240,468,000**	
LIBYA[e]	AGIP	Bu Attifel, 1968	14,300	25	33			41.0
		Rimal-Katib, 1965	14,000	2	6			35.0
	ELF	El Meheiriga	10,500	2	2			46.0
	LNOC	Arshad, 1966	10,100					42.0
		Jebel, 1962	8,100					38.0
		Majid, 1968	9,000- 9,800					...
		Don Mansour Unit	5,600					...
		Nasser, 1959	5,500- 7,600					38.0
		Lehib-Dor Marada Unit, 1965	9,500					50.0
		Raguba, 1961	5,400					43.0
		Beda, 1959	4,000					36.0
		Bualawn, 1972	6,000					40.0
		Dor, 1967	6,400					33.2

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
		Kotla, 1963	5,500					34.0
		Sahabi B & D, 1961	9,000-10,000					39.0
		Sarir, 1961	9,000					37.2
		Amal, 1959	9,900					37.5
		Ora, 1962	7,250					40.2
		Ghani, 1978	6,000					40.0
		Bahi, 1968	3,500- 3,750					43.4
		Belhedan, 1962	7,000					33.6
		Dahra, 1959	3,100- 3,700					37.0-41.0
		Defa, 1969	5,400- 5,900					35.6
		Gialo, 1961	2,200- 6,300					35.7
		Harsh, 1978	7,400	491	491	1,031,000	15,730,475,000	34.6
		Khalifa, 1978	5,400- 7,000					34.6
		Masrab, 1978	10,000					39.6
		Samah, 1961	9,000					33.4
		Waha, 1960	6,000					36.0
		Zaggut, 1962	6,000					36.4
		Balat, 1983	5,100- 5,400					32.2
		Ali, 1975	3,900	1	2			50.0
		Almas, 1975	4,000	5	8			49.5
		Intisar A, 1967	9,750	8	19			45.0
		Intisar B, 1974	9,600	2	2			50.0
		Intisar C, 1967	9,650	1	6			37.5
		Intisar D, 1967	9,400	19	27			39.0
		Intisar E, 1968	5,300- 7,100	8	11			34.7
		Nafoora-Augila, 1966	2,200-10,000	13	55			35.5
		Aswad, 1978	6,250	8	8			46.0
		Sabah, 1977	5,500	36	38			42.0
		Zella, 1977	6,750	27	31			48.1
		Other	7,900- 8,900	1	2			40.4
		Fidaa, 1979	7,000	9	9			41.7
		Hakim, 1978	6,700	3	3			48.5
		Total Libya		**661**	**753**	**1,031,000**	**15,730,475,000**	
MALAYSIA	ESSO MALAYSIA	• Bekok, 1976	5,500	23	30	24,600	91,000,000	47.0
		• Pulai, 1973	4,300	23	32	16,400	83,000,000	42.3
		• Tapis, 1975	6,700	70	106	45,500	201,000,000	45.0
		• Kepong, 1979	6,000	3	10	4,100	9,000,000	47.0
		• Tiong, 1978	5,800	28	42	55,300	102,000,000	47.0
		• Tinggi, 1980	4,400	26	31	32,300	63,000,000	48.0
		• Irong Barat, 1979	3,300	10	12	18,300	32,000,000	35.0
		• Semangkok, 1980	3,700	5	5	38,100	53,000,000	42.5
		• Guntong, 1978	...	9	14	15,890	17,000,000	...
		• Palas, 1979	...	11	11	4,400	4,000,000	...
		• Tabu, 1978	...	9	13	6,600	7,000,000	...
	SARAWAK SHELL BHD.	• Baronia, 1967	7,900	20	40	16,300	143,249,000	42.0
		• Bayan, 1976	4,200	7	7	19,120	16,67 000	35.0
		• Betty, 1967	7,900	10	14	20,320	57,117,000	38.0
		• Bokor, 1972	2,000	18	19	26,210	5,167,000	35.0
		• Siwa, 1973	4,100	3	4	2,250	1,021,000	25.0
		• Temana, 1972	3,100	17	27	12,120	33,324,000	35.0
		• Tukau, 1966	5,000	26	44	23,290	83,501,000	29.2
		• D18, 1981	4,000	5	5	140	51,000	35.0
	SABAH SHELL	• Barton, 1971	2,400	4	8	4,110	7,900,000	37.0
		• Erb West, 1977	6,785	12	15	7,220	19,235,000	30.0
		• Ketam, 1977	4,800	3	4	1,830	668,000	33.0
		• Samarang, 1972	5,700	46	66	51,020	215,922,000	37.0
		• South Furious, 1974	3,300	8	15	4,860	11,174,000	30.0
		• St. Joseph, 1975	2,200	11	12	11,190	14,284,000	32.0
	SARAWAK SHELL BHD.	• Baram, 1964	9,500	12	36	12,520	133,170,000	36.0
	PETRONAS CARIGALI SDN. BHD.	• Bakau, 1971	11,000	2	3	250	6,991,000	39.5
		• Fairley Baram, 1973	8,655	...	2	...	5,846,000	39.5
		• West Lutong, 1966	5,600	12	27	8,200	117,993,000	39.5
	PETRONAS CARIGALI SDN. BHD.	• Tembungo, 1971	6,000	8	16	3,300	27,400,000	40.0
		Total Malaysia		**441**	**670**	**485,740**	**1,582,692,000**	
MEXICO[e]	NORTH ZONE, N.E.	Misión, 1945	5,440	3	3			...
		Monterrey, 1950	6,510	5	6			...
		Tigrillo, 1971	3,342	...	11			...
		Other	...	11	77			...
	NORTH ZONE, N.	• Arenque, 1970	11,362	17	17			26.0
		Constituciones, 1956	6,350	176	176			17.0
		Ebano-Pánuco, 1901	1,450	324	324			12.0
		Tamaulipas	4,200	152	152			19.0
		Other	...	...	...			...
	NORTH ZONE, S.	Chicontepec, 1973	4,264	220	220			34.1
		• Isla de Lobos, 1963	6,875	9	9			40.0

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Mbl	°API gravity
	• Marsopa, 1974	10,198	7	7			39.0
	Naranjos-C. Azul, 1909	1,800	206	206			22.0
	Tres Hermanos, 1959	6,960	34	34			21.0
	Other	...	...	...			...
CENTRAL ZONE, POZA RICA	• Atún, 1966	9,040	7	7			37.0
	• Bagre, 1973	9,919	8	8			33.0
	Escolín, 1942	7,216	95	95			26.3
	Hallazgo, 1955	10,170	36	36			25.0
	Jiliapa, 1958	7,390	29	29			24.0
	Mecatepec, 1941	7,544	32	32			29.8
	Miquetla, 1959	6,480	57	57			35.0
	Poza Rica, 1930	7,090	132	132			35.0
	Pres. Alemán, 1949	8,036	86	86			26.0
	Remolino, 1962	10,745	36	36			29.5
	San Andrés, 1956	10,410	123	123			29.0
	Other	...	315	316			...
CENTRAL ZONE, CUENCA DEL PAPALOAPAN	Matapionche, 1974	11,129	29	45			35.6
	Other	...	22	31			...
SOUTHERN ZONE, NANCHITAL	Ixhuatlán Ote., 1965	1,960	20	34			22.6
	Moloacán, 1962	500	170	207			22.3
	Santa Rosa, 1952	1,312	6	9			25.4
CENTRAL ZONE, N. FAJA DE ORO	Acuatempa, 1955	4,085	6	6			21.0
	Muro, 1965	3,966	11	19			17.0
	Ordónez, 1952	5,220	8	8			21.0
	Ocotepec, 1953	3,737	13	13			20.0
	Santa Agueda, 1953	4,780	3	3			16.0
	Other	...	57	57			...
SOUTHERN ZONE, EL PLAN	Agata, 1956	3,830	9	15			...
	Bacal, 1976	3,500	24	40			35.0
	Concepción, 1974	1,600	3	15			31.0
	Cuichapa, 1935	2,200	63	123			30.0
	El Plan, 1931	1,700	67	86			30.0
	Lacamango, 1973	1,700	18	27			26.3
	Los Soldados, 1953	4,492	18	22			32.0
	Other	...	26	38			...
SOUTHERN ZONE, AGUA DULCE	Blasillo, 1967	7,216	31	58	2,427,650	13,748,979,200	40.0
	Cinco Presidentes, 1960	6,862	73	134			35.0
	Burro, 1931	2,200	23	38			26.0
	Venta, 1954	4,730	20	83			41.0
	Ogarrio, 1957	5,790	57	194			38.0
	Otates, 1965	7,469	12	18			39.0
	Rodador, 1971	11,398	14	14			26.0
	Sánchez Magallanes, 1957	4,240	73	345			27.0
	San Ramón, 1967	9,517	29	65			30.0
	Tonalá, 1928	1,770	31	61			28.0
	Other	...	3	15			...
SOUTHERN ZONE, COMALCALCO	Agave, 1977	13,450	7	16			41.7
	Arroyo Zanapa, 1978	14,599	1	2			38.9
	Arteza, 1977	11,800	3	5			26.4
	Ayapa, 1972	8,200	3	5			7.2
	Cacho López, 1977	14,250	1	1			29.0
	Cáctus, 1972	14,100	14	30			31.5
	Carrizo, 1962	3,500	18	35			23.3
	Castarrical, 1967	10,080	38	59			29.3
	Comoapa, 1979	14,432	4	6			44.5
	Copano, 1977	11,890	9	10			43.9
	Cunduacán, 1974	13,775	12	42			28.9
	El Golpe, 1963	3,500	93	135			25.7
	Giraldas, 1977	15,225	21	22			37.0
	Iride, 1974	13,775	12	16			28.5
	Muspac, 1982	9,676	1	13			57.0
	Mecoacán, 1957	2,200	17	30			8.6
	Mora, 1981	...	61	63			38.1
	Mundo Nuevo, 1977	11,800	4	5			46.0
	Níspero, 1974	14,100	4	18			34.4
	Paredón, 1978	15,690	12	13			39.8
	Oxiacaque	11,150	5	21			29.1
	Platanal, 1978	15,900	...	...			30.2
	Río Nuevo, 1975	14,950	5	5			34.8
	Samaria (Cret), 1973	14,209	26	49			31.0
	Santuario, 1966	9,617	28	37			37.0
	Sitio Grande, 1972	13,766	19	22			35.0
	Sunuapa, 1978	12,887	2	7			32.8
	Tapijualpa, 1982	15,613	1	12			39.8
	Tintal, 1968	5,904	4	6			22.0
	Topén, 1978	11,172	2	3			25.4
	Tupilco, 1959	9,685	67	101			27.0
	Bellota, 1982	17,056	9	12			41.0

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
		Cardenas, 1979	17,548	26	45			38.0
		Chiapas, 1979	12,136	5	7			42.0
		Fenix, 1979	17,876	4	7			40.0
		Iris, 1979	14,432	8	8			39.2
		Jujo, 1980	17,548	18	19			32.0
		Caparroso, 1982	18,368	1	1			41.2
		Tecominoacan, 1983	19,519	1	5			37.5
		Jolote, 1983	18,119	1	1			39.4
		Artesa Terc., 1984	...	2	3			28.0
		Carmito, 1980	10,050	1	1			45.6
		Edén, 1983	17,590	1	2			38.5
		Samaria Terc., 1965	4,920	16	23			13.9
		Other	...	16	37			...
	GULF OF CAMPECHE	• Cantarell, 1976	8,528	63	75			21.3
		• Abkatun, 1978	11,800	25	35			30.0
		• Ku, 1979	10,000	8	15			22.0
		• Pol, 1979	12,600	8	8			35.0
		• Chuc, 1982	13,100	1	3			35.0
		• Ixtoc, 1984	...	1	2			35.0
		Total México		**3,768**	**5,120**	**2,427,550**	**13,748,979,200**	
MOROCCO[e]		Sidi Rhalem, 1962	6,265- 7,185	4	4	370	16,011,700	...
		Rharb, 1951	4,590					...
		Total Morocco		**4**	**4**	**370**	**16,011,700**	
NETHERLANDS	UNOCAL	• Helm, 1979	4,400	7	8	3,139	6,124,136	17.9
		• Helder, 1980	4,800	12	13	6,994	13,683,383	21.6
		• Hoorn, 1981	5,000	7	7	9,074	15,095,020	25.8
	NAM	DeLier, 1955	5,200	22	33	491	16,561,600	34.8
		Rotterdam, 1984	...	2	2	1,032	585,000	32.0
		Berkel, 1954	...	17	17	3,132	3,855,800	20.0
		Ysselm, 1956	5,200	59	86	3,881	87,198,300	22.0
		Pynacker, 1955	...	4	5	491	5,780,500	22.0
		Wassenaar, 1956	4,200	28	41	1,975	45,828,900	18.7
		Zoetermeer, 1957	3,200	30	30	572	9,573,400	16.5
		Schoonebeek, 1944	2,500	265	356	11,353	228,459,100	35.6
		Other	...	70	91	70	626,000	...
	CONOCO	Kotter, 1980	6,500	8	10	21,076	17,733	33.0
		Logger, 1982	6,500	7	8	9,929	4,212	33.5
	AMOCO	• Rijn, 1982	6,600	12	25	15,880	5,930,000	35.0
		Total Netherlands		**550**	**732**	**89,089**	**439,323,084**	
NEUTRAL ZONE	AOC	• Khafji, 1961	4,400-10,300	109	126			28.2
		• Hout, 1969	5,300-10,500	48	68			33.0
	CHEVRON & KOC	Wafra, 1953	1,100- 7,000	312	392	343,000	4,162,893,000	18.9-23.5
		S. Fuwaris, 1963	6,300	6	9			25.0
		S. Umm Gudair, 1966	8,900	16	18			24.3
		Total Neutral Zone		**491**	**613**	**343,000**	**4,162,893,000**	
NEW ZEALAND	SHELL-BP-TODD	• Kapuni, 1959	11,700	9	12	6,469	40,856,247	54.0
	MAUI DEVELOPMENT	• Maui, 1969	11,000	11	14	14,286	20,146,970	58.0
	PCNZ	McKee, 1981	7,848- 8,251	17	19	8,659	6,887,988	38.5
		Kaimiro, 1982	11,900	1	1	74	62,692	46.4
		Total New Zealand		**38**	**46**	**29,488**	**67,953,897**	
NIGERIA	AGIP-PHILLIPS	Akri, 1977	9,600-10,600	6	11	8,465	59,065,599	41.8
		Akri West, 1975	9,900-10,200	...	2	...	482,258	31.4
		Ashaka, 1968	9,700-12,000	1	1	429	2,128,652	36.7
		Beniku, 1974	12,000	1	2	360	3,309,326	29.5
		Ebegoro, 1976	11,500-12,000	7	9	8,685	56,328,995	35.7
		Ebocha, 1965	8,000-10,900	10	16	7,794	105,779,769	36.2
		Idu, 1973	7,750-10,700	...	10	...	23,862,581	28.0
		Kwale, 1968	10,000-11,500	3	4	1,154	3,095,572	41.5
		M'Bede, 1966	7,300- 9,400	11	14	14,984	152,227,985	41.6
		Obama, 1975	11,600-14,300	11	8	17,643	86,517,279	40.8
		Obiafu, 1973	9,300-12,200	13	17	11,991	75,575,425	43.9
		Obrikom, 1973	8,000-10,000	7	12	6,173	52,019,234	41.5
		Odugri, 1972	12,500	1	2	730	9,434,454	40.2
		Ogbogene, 1976	10,000	...	2	...	3,302,763	37.0
		Ogbogene W., 1981	13,000	...	1	...	353,135	56.2
		Okpai, 1968	10,000-12,000	8	8	3,832	16,139,904	44.3
		Omoku W., 1975	11,500	1	1	634	4,716,282	27.4

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	Oshi, 1974	9,600-11,300	15	11	10,529	59,744,703	37.7
	Tebidaba, 1975	10,300-13,300	13	10	19,277	105,788,553	34.7
	Umuoru, 1975	14,100	3	4	1,974	3,698,886	42.2
	Agwe, 1977	10,800	...	1	...	1,998,132	47.9
	Clough Creek, 1977	10,000-12,400	11	9	9,519	16,890,585	35.6
	Beniboye N.	9,000-10,000	9	9	8,513	5,233,810	33.9
	Taylor Creek, 1985	13,724	...	...	...	...	...
PHILLIPS	Gilli-Gilli, 1967	7,600-14,000	2	2	1,036	2,956,448	46.7
CHEVRON	Abiteye, 1970	5,750- 9,400	12	19	10,264	59,300,936	39.7
	• Delta, 1965	5,600- 9,500	22	27	18,889	157,813,222	37.3
	• Delta South, 1965	7,100-10,179	18	27	25,807	26,335,514	38.4
	• Isan, 1970	5,900- 9,000	4	11	2,307	41,381,423	40.4
	Makaraba	7,100-12,005	12	26	23,841	78,212,263	27.7
	• Malu, 1969	4,800- 6,300	12	18	16,864	91,734,394	40.4
	• Mefa, 1965	8,570-12,030	4	5	5,516	15,533,842	38.1
	• Meji, 1965	5,200-10,900	19	22	17,723	139,025,576	31.9
	• Meren, 1965	5,000- 7,500	28	51	59,359	453,033,041	31.9
	• Okan, 1964	5,500- 9,245	36	67	37,026	416,770,100	38.1
	• Parabe/Eko, 1968	4,500- 8,200	11	23	6,702	96,307,197	40.4
	Utonana, 1971	7,400- 9,165	2	5	640	7,660,783	20.4
	• W. Isan, 1971	7,825-10,229	4	9	3,028	33,221,198	40.4
	Yorla South, 1974	11,389-12,635	...	2	...	834,040	41.0
	Jisike, 1975	6,300- 7,600	3	4	2,261	5,138,087	41.1
	Robertkiri, 1964	11,484-13,190	5	12	5,398	5,280,977	40.2
	• Tapa, 1978	8,150-10,842	10	10	11,527	243,737,794	39.5
ASHLAND	Izombe-Ossu, 1974	9,500	15	15	12,409	46,855,328	41.0
	• Akam, 1980	6,700	9	9	9,331	11,651,481	35.2
	• Adanga, 1980	5,600- 7,300	8	8	15,739	5,804,731	35.0
ELF	Aghigo, 1972	...	15	22	3,815	21,313,918	24.8
	Okpoko, 1967	...	10	24	10,203	26,873,488	24.8
	Obodo-Jatumi, 1966	...	22	25	11,251	56,679,802	24.8
	Upamini, 1965	...	11	18	2,443	14,178,237	24.8
	Obagi, 1964	...	70	77	54,576	334,488,915	24.6
	Erema, 1972	...	4	5	3,851	7,863,600	24.6
MOBIL	• Adua, 1967	6,970	4	5	8,493	40,238,557	30.3
	• Asabo, 1966	5,600	8	14	14,747	151,393,607	32.4
	• Ekpe, 1966	8,200	5	17	15,867	182,909,275	30.3
	• Ekpe-WW, 1977	6,810	6	6	9,913	30,203,047	30.3
	• Eku, 1966	5,420	1	6	1,608	14,861,191	30.8
	• Enang, 1968	6,600	18	23	18,531	113,277,609	35.1
	• Etim, 1968	6,200	7	9	18,594	99,114,888	32.9
	• Idoho, 1966	9,020	3	4	2,030	27,976,695	30.8
	• Inim, 1966	5,850	8	10	17,726	133,519,784	37.8
	• Mfem, 1967	5,200	3	3	4,339	22,653,656	36.1
	• Ubit, 1968	5,400	30	45	27,197	168,257,669	36.1
	• Unam, 1968	5,180	6	9	6,733	38,167,314	33.5
	• Utue, 1966	5,700	4	7	7,536	64,123,484	36.8
	• Isobo, 1968	7,345	3	4	2,037	6,357,841	30.8
	• Iyak	...	6	6	23,718	26,341,070	38.7
	• Asabo 'D'	...	...	2	1,327	1,373,470	35.0
	• Ata	...	...	...	...	433	...
	• Oso	...	...	...	...	8,421	...
	• Usari	...	...	...	...	5,885	...
INPEX	Ogharefe, 1973	9,900	8	11	5,455	26,387,218	47.4
SHELL (MIDWEST)	Ugh-Ogini, 1964	5,860	5	18	2,491	20,050,706	19.0
	Ugh-Uzere-East, 1960	8,500	8	14	3,972	84,448,451	23.0
	Ugh-Uzere-West, 1964	8,500	5	11	3,035	98,300,602	23.0
	Ugh-Olomoro, 1963	7,000-10,000	14	33	15,258	269,882,416	22.0
	Ugh-Oweh, 1964	12,300	4	11	2,331	91,616,216	28.0
	Ugh-Kokori, 1960	8,000- 9,800	17	27	13,809	304,530,524	42.0
	Ugh-Afiesere, 1966	8,000- 9,000	20	33	9,711	111,236,709	22.0
	Ugh-Eriemu, 1961	12,500	14	16	5,539	39,559,309	26.0
	Ugh-Ughelli-East, 1959	11,800	5	11	2,673	87,679,532	35.0
	Ugh-Ughelli-West, 1963	7,400-10,200	5	10	2,880	30,963,842	21.0
	Ugh-Utorogu, 1964	9,000	8	19	6,134	127,088,672	25.0
	Ugh-Oroni, 1964	12,000	1	7	583	25,514,529	22.0
	Ugh-Warri-River, 1961	12,264	1	3	990	14,521,505	31.0
	Ugh-Ewreni, 1968	10,900	5	11	2,805	34,380,013	38.0
	Ugh-Isoko, 1960	...	1	2	819	5,660,976	19.0
	Forc-Odidi, 1967	10,980	14	25	17,480	196,223,250	37.0
	Forc-Opukushi, 1963	7,823	4	15	16,307	104,736,336	29.0
	Forc-Jones Creek, 1967	7,000- 9,000	14	34	23,215	376,852,060	29.0
	Forc-Opuama, 1973	...	2	5	1,901	23,688,355	41.0
	Forc-Egwa, 1967	9,350	10	24	8,340	126,445,444	37.0
	Forc-Forcados/Yokri, 1968	10,859	46	89	62,553	504,060,435	22.0
	Forc-Batan, 1968	11,000	2	9	1,169	53,363,918	27.0
	Forc-Escravos Beach, 1969	8,176	5	13	5,827	54,288,857	36.0
	Forc-Otumara, 1969	8,176	8	26	16,390	142,482,907	25.0

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	Forc-Saghara, 1970	8,590	1	6	1,494	29,475,360	31.0
	Forc-Ajuju, 1970	13,324	...	2	128	9,443,072	27.0
	Forc-Benisede, 1973	...	6	21	14,613	91,631,474	23.0
	Node-Sapele, 1970	12,788	10	19	13,729	101,991,778	42.0
	Node-Oben, 1972	12,036	17	20	28,585	108,918,962	40.0
	Forc-Opukushi N., 1977	...	1	2	447	2,245,933	30.0
	Abura	...	1	3	3,304	15,204,769	44.8
	Rapele	...	1	3	1,499	22,052,181	44.4
	Amukpe	...	1	2	978	11,211,014	38.9
	Osioka	...	...	2	168	6,807,890	...
SHELL (EAST)	Phl-Bomu, 1958	6,500- 7,500	14	38	11,439	347,257,106	36.0
	Phl-Imo River, 1959	5,800-10,000	29	45	33,564	445,753,287	32.0
	Phl-Nkali, 1963	12,000	1	10	25	27,186,884	42.0
	Phl-Elelenwa, 1959	11,000	3	11	2,011	29,671,024	39.0
	Phl-Umuechem, 1969	5,800-10,700	8	18	6,646	145,124,471	36.0
	Phl-Apara, 1960	9,000	5	7	4,404	23,171,605	36.0
	Phl-Bodo-West, 1959	9,700	7	11	6,678	76,098,573	29.0
	Phl-Afam, 1956	6,000	9	15	4,035	57,269,591	45.0
	Phl-Yoria, 1970	11,917	7	13	4,704	57,022,633	44.0
	Phs-Bonny, 1959	12,254	7	17	6,526	85,206,972	36.0
	Phs-Cawthorne Channel, 1963	11,000	16	28	44,096	252,045,390	38.0
	Phs-Ekulama, 1958	10,483	17	29	32,140	178,116,398	32.0
	Phs-Soku, 1958	11,500	12	21	10,481	103,207,438	31.0
	Phs-Orubiri, 1971	...	2	6	4,008	14,768,373	38.0
	Egb-Oguta, 1965	10,300	9	24	9,738	126,067,988	46.0
	Eade-Utapate South, 1974	...	5	11	6,940	32,946,680	44.0
	Eade-Opobo South, 1974	...	4	6	6,889	14,183,795	44.0
	Ibigwe	...	...	2	...	...	...
	Korokoro	...	6	8	4,121	18,137,585	34.3
	Otamini	...	4	5	2,100	13,033,548	21.8
	Ugada	...	1	1	69	994,393	...
	Ahia	...	7	13	4,383	81,988,746	38.2
	Akpor	...	1	3	138	1,795,146	27.5
	Alakiri	...	5	15	4,331	60,674,129	38.2
	Assa	...	...	2	...	...	20.7
	Egbema West	...	5	17	6,185	75,057,068	42.2
	Ebubu	...	3	8	218	18,606,369	22.2
	Egbema	...	6	7	5,800	49,619,583	35.5
	Cesw-Nun River, 1960	...	3	6	3,406	29,703,607	39.0
	Cesw-Etelebou, 1971	12,000	5	9	11,011	114,374,821	33.0
	Cesw-Kolo Creek, 1960	12,000	11	25	18,508	115,956,605	42.0
	Cesw-Diebu Creek, 1966	...	10	12	12,176	98,597,774	43.0
	Phl-Isimiri, 1964	5,900-11,000	3	6	1,798	36,562,113	28.8
	Phl-Onne, 1965	10,384	3	3	872	8,680,261	29.0
	Phl-Obigbo-North, 1963	6,500-10,000	25	41	14,884	165,400,569	22.0
	Phl-Ajokpori, 1967	...	2	2	973	4,800,196	29.0
	Phl-Agbada, 1960	8,000-12,000	22	45	19,233	165,277,346	32.1
	Phl-Akuba, 1967	...	1	1	356	3,949,170	29.0
	Cesw-Adibawa, 1967	11,950	5	23	8,501	66,782,991	26.0
	Cesw-Adibawa NE, 1973	...	1	3	2,270	12,501,251	26.0
	Cesw-Ubie, 1961	14,380	2	5	4,373	28,638,766	28.0
	Phl-Obeakpu, 1975	...	2	4	3,504	14,602,796	45.0
	Cosw-Nembe Creek, 1973	...	28	36	79,796	171,472,502	35.0
	Phs-Akaso, 1979	...	1	1	1,540	2,327,374	30.0
	Bugama Creek	...	1	6	226	12,654,206	43.0
	Kalaekule	...	2	5	1,227	447,856	39.6
	Krakama	...	1	10	632	16,737,788	23.8
	Odeama Creek	...	3	4	13,035	9,987,094	33.3
	Tai	...	2	2	573	4,471,587	37.4
TEXACO-CHEVRON	• Pennington, 1965	5,000-10,400	2	3	2,429	23,654,492	38.2
	• Middleton, 1972	5,000- 7,000	4	5	3,105	13,952,875	36.6
	• North Apoi, 1973	4,000- 8,100	23	36	36,023	139,244,734	35.8
	• Funiwa, 1978	5,000- 7,000	21	32	23,395	27,703,650	38.2
	• Sengana, 1967	...	1	1	357	663,682	46.7
	Total Nigeria		**1,253**	**2,151**	**1,467,542**	**11,344,561,207**	
NORWAY							
PHILLIPS	• Ekofisk, 1968	10,000	35	38	96,351	880,285,101	41.1
	• West Ekofisk, 1970	10,300	11	11	9,819	80,398,850	43.9
	• Cod, 1968	9,500	6	6	3,440	19,017,140	55.0
	• Tor, 1970	10,000	8	13	12,684	111,014,589	38.0
	• Albuskjell, 1972	10,400	15	15	7,330	48,808,008	45.0
	• Edda, 1972	10,480-10,600	7	7	2,580	22,572,304	41.5
	• Eldfisk, 1970	9,350-10,000	32	32	62,000	201,700,311	37.6
MOBIL	• Statfjord, 1974	7,700	51	82	*591,033	*802,512,696	39.0
AMOCO	• Valhall, 1972	8,200	20	20	43,500	57,980,000	35.0
CONOCO	• Murchison, 1975	9,900	14	14	*18,217	*50,525,750	38.0
	• Ula, 1976	11,000	3	3	14,509	5,310,000	39.0
	Total Norway		**202**	**241**	**961,483**	**2,280,124,749**	

*Norway's production share.

		Name of field, discovery date	Depth, ft	No. of wells — Producing	No. of wells — Total	Production — 1986 average B/d	Production — Cumulative to Dec. 31, 1986 Bbl	°API gravity
OMAN	PDO	Lekhwair, 1968	4,352	31	47	18,000	50,698,000	37.8
		Natih, 1963	4,788	33	61	27,000	333,517,000	31.0
		Shibkah, 1976	2,591	2	2	...	655,000	31.0
		Fahud, 1964	2,499	128	203	69,000	726,964,000	32.7
		Yibal, 1962	8,465	151	153	148,000	560,519,000	40.2
		Al Huwaisah, 1969	5,320	36	36	18,000	159,389,000	37.0
		Burhaan, 1984	4,011	1	2	1,000	1,100,000	36.7
		Ghaba North, 1972	2,227	12	16	12,000	45,638,000	35.8
		Saih Nihaydah, 1972	8,700	13	18	28,000	135,813,000	39.0
		Saih Rawl, 1973	9,826	15	16	10,000	83,928,000	41.1
		Qarn Alam, 1972	1,354	4	6	2,000	18,599,000	14.8
		Habur, 1975	5,800	1	2	...	4,277,000	14.8
		Mahjour, 1979	11,700	1	3	1,000	1,845,000	37.2
		Al Ghubar, 1974	1,916	4	4	4,000	2,879,000	23.5
		Barik, 1974	8,856	3	3	2,000	717,000	42.1
		Anzauz, 1984	7,098	3	3	5,000	3,078,000	47.8
		Hasirah, 1984	8,708	...	3	...	245,000	48.8
		Zauliyah, 1981	8,177	6	9	8,000	8,276,000	45.2
		Wafra, 1983	5,510	5	5	1,000	617,000	40.6
		Suwaihat, 1982	6,452	5	5	8,000	4,881,000	36.0
		Bahja, 1984	5,697	6	6	4,000	2,561,000	44.5
		Fayyadh, 1983	3,608	1	1	...	125,000	27.0
		Sayyala, 1981	3,690	11	11	27,000	11,182,000	49.7
		Zareef, 1985	3,264	3	3	1,000	506,000	46.9
		Rima, 1979	3,247	34	34	72,000	83,323,000	32.8
		Rasha, 1982	4,310	3	5	1,000	617,000	32.8
		Nimr, 1980	3,296	20	31	7,000	3,242,000	21.3
		Karim West, 1982	3,546	8	12	10,000	5,646,000	23.5
		Amal/Amal South, 1973	4,638	7	10	4,000	3,868,000	22.5
		Kaukab, 1983	8,282	1	1	2,000	644,000	35.8
		Marmul, 1977	5,087	161	167	45,000	94,680,000	22.0
		Birba, 1978	8,528	...	3	1,000	7,280,000	33.4
		Rahab, 1977	3,237	17	18	3,000	4,129,000	22.0
		Qaharir East, 1978	4,936	1	2	...	626,000	30.6
		Qata, 1979	4,707	9	13	2,000	2,893,000	26.2
		Qaharir, 1978	4,536	23	26	8,000	18,457,000	30.6
		Runib, 1978	3,215	6	6	...	33,000	20.3
		Jalmud, 1979	4,236	2	2	...	21,000	21.0
		Jalmud North, 1980	4,265	2	2	...	16,000	21.0
		Jawdah, 1984	3,570	3	3	1,000	191,000	22.0
	ELF GROUP	Sahmah, 1978	12,400	5	5	5,540	20,851,272	45.1
		Ramlat	...	1	1	177	54,916	...
	OCCIDENTAL PETROLEUM	Safah, 1983	6,500	11	11	2,732	2,018,752	37.8
		Total Oman		**789**	**972**	**558,449**	**2,406,599,940**	
PAKISTAN	PAKISTAN OILFIELD LTD.[e]	Balkassar, 1946	9,398	3	5			26.0
		Joya Mair, 1944	6,900	2	2			15.0
		Dhulian, 1936	8,899	...	...			48.0
		Khaur, 1915	9,306	1	1	10,587	97,409,000	...
	PAKISTAN PETROLEUM LTD.[e]	Adhi,[c] 1978	9,118- 9,190	3	3			48.5
	OGDC[e]	Toot, 1968	15,125	8	10			38.0
		Fimkassar, 1982	11,465	1	1			39.0
		Tando Alam, 1984	7,546- 8,205	8	9			41.4
	UNION TEXAS	Khaskeli, 1981	3,500	5	9	3,615	6,235,091	39.0
		Laghari, 1983	2,500	5	7	8,459	7,195,749	42.0
		Dabhi, 1984	5,500	3	4	2,117	851,936	39.0
		Mazari, 1984	5,200	2	4	802	292,864	43.0
		Other	...	...	8	...	...	31.0-46.0
	OCCIDENTAL	Dhurnal, 1984	13,100	3	3	15,420	10,030,702	38.0
		Total Pakistan		**44**	**86**	**41,000**	**122,015,342**	
PERU	PETROMAR S.A.	• Peña Negra, 1960	3,000- 8,500	191	268	11,793	99,691,201	38.0
		• Lobitos, 1960	3,500- 7,500	113	247	10,224	46,968,371	38.0
		• Litoral, 1955	1,500- 6,000	89	139	3,178	45,445,700	36.0-40.0
		• Providencia, 1967	3,000- 7,000	52	78	1,366	20,193,161	38.0-40.0
		Other	...	5	12	153	151,899	...
	OCCIDENTAL	• Bartra, 1979	8,000- 8,930	13	16	6,943	15,136,728	11.5
		• Capahuari Sur, 1973	11,800-12,900	16	26	12,485	124,934,962	35.6
		• Dorissa, 1978	9,800-10,600	10	12	11,892	31,385,834	34.0
		• Forestal, 1973	9,000- 9,900	8	10	7,503	30,228,795	26.7
		• Huayuri Sur, 1977	10,000-10,800	10	12	4,935	15,801,786	29.2
		• San Jacinto, 1978	7,200- 9,760	11	22	9,717	24,343,364	13.1-23.5
		• Shiviyacu, 1973	9,100-10,100	15	19	16,323	50,161,967	20.8
		• Jibaro, 1974	10,110-10,155	6	6	3,638	5,162,629	11.3
		• Jiberito, 1981	9,000- 9,650	5	5	5,933	7,348,275	10.8
		Other	...	4	9	807	1,834,871	...

WORLDWIDE PRODUCTION

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	OCCIDENTAL/BRIDAS	Talara area	1,343- 6,080	825	1,292	8,898	41,990,856	34.0
	PETROPERU	Talara-Lima area, 1869	2,000- 9,000	1,967	5,811	27,377	935,719,474	34.1
		Corrientes, 1971	10,000-12,600	32	38	27,668	78,271,610	29.8
		Pavayacu, 1972	9,600-11,300	12	14	3,512	14,110,612	30.2
		N. Esperanza, 1980	10,200-10,700	2	5	1,732	4,129,989	44.0
		Yanayacu, 1974	11,400-13,600	7	9	1,514	3,298,796	19.1
		Capirona, 1972	9,800-12,000	4	5	995	3,010,387	25.3
		Valencia, 1975	10,500-11,200	2	3	172	500,412	44.0
		Other	...	39	62	673	24,763,919	...
		Total Peru		**3,438**	**8,120**	**179,431**	**1,614,585,598**	
PHILIPPINES	ALCORN PHILIPPINES	• South Nido, 1977	6,576- 6,885	3	6	1,054	15,398,000	27.1
		• Matinloc, 1978	6,656- 6,750	5	5	3,217	7,893,000	43.8
	ALCORN PALAWAN	• Cadlao, 1977	5,734- 5,881	2	2	2,640	8,505,000	45.6
		Total Philippines		**10**	**12**	**6,911**	**31,796,000**	
QATAR[e]	QGPC	• Bul Hanine, 1970	6,000	14	15			35.0
		Dukhan, 1940	6,500	116	161			41.1
		• Idd El Shargi, 1960	4,500- 8,250	25	31	332,000	3,942,055,000	35.0
		• Maydan-Mahzam, 1963	7,000	19	24			38.0
		Total Qatar		**174**	**231**	**332,000**	**3,942,055,000**	
RAS al KHAIMAH	CHEVRON	• Saleh, 1983	14,500	6	6	9,811	9,180,868	50.0
		Total Ras al Khaimah		**6**	**6**	**9,811**	**9,180,868**	
SAUDI ARABIA[e]	ARAMCO	Abqaiq, 1940	6,690					37.0
		Abu-Hadriya, 1940	9,340					35.0
		• Abu-Safah, 1963	6,600					30.0
		• Berri, 1964	8,300					32.0-34.0
		Dammam, 1938	4,800					35.0
		Fadhili, 1949	8,050					39.0
		Ghawar, 1948	6,920					34.0
		Harmaliyah, 1971	8,430					35.0
		Khurais, 1957	5,200	588	588	4,837,000	52,677,359,000	33.0
		Khursaniyah, 1956	6,560					31.0
		• Manifa, 1957	7,950					
		• Marjan, 1967	6,800					33.0
		• Qatif, 1945	7,100					33.0-34.0
		• Safaniyah, 1951	5,100					27.0
		• Zuluf, 1965	5,800					32.0
		Total Saudi Arabia		**588**	**588**	**4,837,000**	**52,677,359,000**	
SHARJAH	CRESCENT[e]	• Mubarek,[c] 1972	...	4	4	9,840	78,096,900	37.0
	AMOCO	Saaja and Moveyid,[c] 1980	10,200-12,300	16	16	51,302	76,800,000	50.0
		Total Sharjah		**20**	**20**	**61,142**	**154,896,900**	
SPAIN	SHELL ESPANA	• Amposta Marino North, 1970	10,000	3	3	1,450	54,929,000	37.0
		• Castellon B5/8, 1976	9,000	...	3	450	14,464,000	35.0
	CHEVRON	Ayoluengo, 1964	4,600- 5,200	35	51	1,855	14,224,701	33.0
	ENIEPSA	• Tarraco, 1973	8,800	...	3	445	14,547,234	35.2
		• Casablanca, 1975	8,900	7	9	32,062	68,688,289	32.6
		• Dorada, 1975	6,700	...	4	...	16,565,228	21.5
		• Gaviota,[c] 1980	8,300	3	3	397	145,053	52.7
		• Salmonete, 1984	12,600	...	1	1,131	1,529,323	44.0
		Total Spain		**48**	**77**	**37,790**	**185,092,828**	
SURINAME	STAATSOLIE	Tambaredjo, 1981	984	56	56	1,938	1,505,000	15.9
		Total Suriname		**56**	**56**	**1,938**	**1,505,000**	
SYRIA	SPC	Alian, 1974	5,900	25	37	990	6,130,000	19.0
		Gbebeh, 1976	2,300	54	75	4,080	5,900,000	18.0
		Jebisseh, 1968	2,000- 3,300	132	219	7,040	25,050,000	18.0
		Karachok, 1956	6,500	103	119	28,900	157,240,000	20.0
		Rumilan, 1962	6,500	59	66	5,275	44,400,000	24.0
		Soudie, 1959	6,500	532	579	106,080	695,000,000	24.0
		Tichrine, 1976	2,600	58	73	3,640	11,510,000	18.0
		Other	...	...	...	5,400	5,320,000	...
		Total Syria		**963**	**1,168**	**181,405**	**950,550,000**	

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
THAILAND	UNOCAL	• Erawan,[c] 1973	7,000	67	118	6,685	12,120,000	54.6
		• Baanpot,[c] 1980	7,000	...	10	...	1,020,000	54.6
		• Platong,[c] 1976	8,500	29	43	4,219	2,750,000	59.1
		• Satun,[c] 1980	8,500	28	57	3,370	2,290,000	55.1
	THAI SHELL	Sirikit, 1981	5,258- 5,976	42	48	19,900	22,250,000	41.0
		Sirikit West, 1983	5,500	1	2	433	281,224	41.0
		Total Thailand		**167**	**278**	**34,607**	**40,711,224**	
TRINIDAD	AMOCO	• Teak, 1971	15,191	55	95	37,557	215,624,000	29.3
		• Samaan, 1971	11,780	36	48	13,141	169,420,000	36.8
		• Poui, 1974	11,650	33	56	29,967	142,726,000	34.0
		• Cassia, 1973	12,700	5	7	6,652	8,312,000	45.0
		Mora, 1986	8,500	2	5	458	167,000	...
	TNA	• Soldado, 1955	000	337	638	36,874	448,938,000	...
		• Fortin Offshore (FOS), 1954	...	11	35	272	6,896,000	...
	TRINTOPEC	Palo Seco/Erin/McKenzie, 1926	12,718	492	1,539	9,021	113,863,000	...
		Fyzabad/Apex/Quarry, 1920	11,000	322	1,031	3,802	169,042,000	...
		Coora/Quarry, 1936	14,000	184	722	1,856	90,401,000	...
		Galeota, 1963	6,304	50	105	3,324	14,148,000	...
		Central Los Bajos, 1973	...	130	192	2,586	7,558,000	...
		Other	...	220	914	2,401	60,003,000	...
	TRINTOC	Area IV & Guapo, 1913	10,626	76	192	1,371	38,225,000	...
		Parrylands, 1913	10,626	110	496	1,652	39,519,000	...
		Point Fortin C & W, 1907	10,626	133	548	2,566	39,861,000	...
		Point Fortin E., 1929	11,000	49	168	753	26,353,000	...
		Penal, 1936	11,067	76	289	1,077	61,686,000	...
		Catshill, 1950	9,693	37	134	381	22,904,000	...
		Brighton, 1908	7,500	66	616	766	72,428,000	...
		Barrackpore, 1911	11,100	56	356	2,225	29,984,000	...
		Guayaguayare, 1902	10,750	118	698	1,550	85,846,000	...
		Forest Reserve, 1913	11,000	293	2,042	4,403	257,340,000	...
		Oropouche, 1944	9,100	34	128	184	6,577,000	...
		Palo Seco, 1929	12,700	78	926	2,173	92,316,000	...
		Trinity, 1956	9,700	13	95	197	15,046,000	...
		Other	...	90	810	884	77,852,000	...
	PCOL	All fields	...	105	493	784	20,332,000	...
		Total Trinidad		**3,211**	**13,378**	**168,877**	**2,333,367,000**	
TUNISIA	ELF-ETAP	• Ashtart	10,500	13	15	23,230	165,483,000	29.8
	ELF-SEREPT	Douleb/Semmama	3,937	15	15	966	17,934,000	40.0
		Tamesmida	3,937	3	3	228	1,973,000	36.9
	CFPT	Sidi El Itayem, 1971	7,500- 7,800	18	20	2,881	20,296,741	44.0
	SHELL	• Tazerka, 1979	4,111- 4,232	8	10	5,130	11,572,000	30.0
	ETAP-AGIP-FINA (SODEPS)[e]	Makrouga, 1980	6,230	3	3			45.0
		Larich, 1979	7,550	1	1			40.7
		Debech, 1980	7,550	1	1	75,065	475,986,500	42.6
	AGIP-TUNISIA (SITEP)[e]	El Borma, 1964	8,250- 8,900	87	101			42.5
		Chouech es Saida, 1971	12,600	1	1			42.9
		Total Tunisia		**150**	**170**	**107,500**	**693,245,241**	
TURKEY	SHELL	Barbes & Deep, 1971	...	16	17	1,950	15,012,000	29.7
		Baysu, 1985	...	3	3	480	175,000	33.3
		Bektas, 1985	...	...	...	280	202,000	33.7
		Beykan, 1964	...	35	39	3,580	57,507,000	33.2
		Cobantepe, 1975	...	2	2	50	218,000	32.8
		Katin, 1971	...	2	2	100	3,636,000	29.5
		Kayakoy, 1960	...	14	20	1,330	18,885,000	38.2
		Kayakoy-West, 1964	...	17	18	2,870	27,948,000	34.7
		Kervan, 1982	...	1	1	10	4,000	30.3
		Kurkan, 1963	...	29	30	2,640	47,564,000	31.4
		Kurkan-South, 1965	...	...	...	360	6,431,000	34.5
		Malatepe, 1970	...	13	14	950	6,647,000	32.7
		Piyanko, 1968	...	1	1	90	1,433,000	35.5
		Sahaban, 1965	...	14	17	700	12,755,000	34.5
		Sahaban South East, 1983	...	...	...	190	269,000	32.0
		Sebyan, 1973	...	1	1	10	104,000	33.4
		Sincan, 1979	...	8	9	1,070	2,491,000	31.4
		Yatir-East, 1973	...	7	9	650	4,937,000	30.9
		Yenikoy-East, 1974	...	2	2	190	3,569,000	31.3
		Yesildere, 1985	...	3	3	290	106,000	34.7
	MOBIL	Selmo, 1964	5,800	20	21	5,003	63,699,214	34.2
		Bulgurdağ, 1961	4,500	1	3	42	2,452,242	37.9

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
TPAO	Raman, 1940	4,500	96	106	4,704	46,914,924	18.7
	Bati Raman, 1961	4,200	79	84	2,133	32,798,101	13.3
	Garzan, 1956	4,700	19	19	2,489	32,562,219	26.2
	Germik, 1968	6,500	9	10	468	3,145,256	18.8
	Mağrip, 1961	5,700	8	9	320	14,342,777	18.4
	Silivanka, 1962	8,200	10	10	900	7,324,243	23.0
	Beycayir, 1976	7,700	2	2	34	176,686	26.1
	Celikli, 1964	10,500	8	8	2,416	2,076,359	35.2
	Sezgin, 1970	5,600	...	...	...	87,559	17.0
	Oyuktas, 1972	7,600	...	...	...	592,005	31.0
	Devecatak, 1973	4,800	1	1	48	214,312	37.0
	K. Osmancik, 1971	3,800	2	2	236	1,929,635	37.6
	Adiyaman, 1971	5,800	15	15	885	7,769,518	27.6
	G. Adiyaman, 1977	5,000	...	...	...	115,836	20.4
	Kuzey Adiyaman, 1977	9,500	...	...	...	59,325	32.0
	Bölükyayla, 1977	10,300	...	...	...	167,663	35.0
	Saricak, 1973	5,250	4	4	200	2,478,887	31.5
	G. Saricak, 1973	5,250	11	11	649	3,578,913	31.5
	Yeniköy, 1973	6,400	13	13	1,209	7,937,915	31.4
	G. Kayaköy, 1976	8,600	3	3	657	1,829,959	30.4
	Sivritepe, 1977	8,200	1	1	70	467,813	33.4
	Camurlu, 1976	5,600	15	15	600	688,546	12.2
	Ikiztepe, 1976	4,900	...	...	...	88,051	11.3
	G. Sahaban, 1978	5,450	11	11	1,320	2,003,791	33.2
	G. Dincer, 1981	5,350	11	11	737	4,015,853	16.7
	Selmo B. Selmo, 1981	5,500	2	2	242	398,265	34.0
	Mehmetdere, 1982	6,700	...	2	...	149,057	31.0
	Karteltepe, 1982	6,550	3	3	324	626,979	32.0
	Cemberlitas, 1983	6,500	21	21	4,410	4,471,652	30.5
	Alcik, 1983	6,500	1	1	69	49,754	32.0
	Cukurtas, 1985	10,000	2	2	138	191,482	36.0
	B. Kozluca, 1985	5,000	11	11	781	179,345	12.0
	Akpinar, 1984	10,500	2	2	308	47,482	31.6
	B. Firat, 1986	8,150	3	3	720	153,680	34.8
ALADDIN MIDDLE EAST LTD.	Kahta, 1958	3,500	10	23	130	3,993,627	11.0
	Yasince, 1974	6,400	2	4	10	1,000	31.0
	Total Turkey		**564**	**621**	**50,042**	**459,672,905**	
UNITED KINGDOM							
AMOCO	• Montrose, 1969	8,200	12	20	13,317	70,559,928	40.5
	• NW Hutton, 1975	12,000	20	30	50,778	69,847,559	36.0
BP	Wytch Farm Bridport Sand,[e] 1974	2,910	8	11	2,700	7,480,800	37.0
	Wytch Farm Sherwood Sandstone,[e] 1977	5,115	3	5	3,400	4,010,400	38.0
	East Midlands, 1939	3,500	68	148	1,210	24,475,014	36.0
	Kimmeridge,[e] 1960	1,800	1	3	150	2,783,700	40.0
	Welton, 1983	5,000	12	18	1,274	758,081	36.0
	Nettleham, 1983	8,850	1	3	255	208,451	35.0
	• Forties and Echo, 1970	7,000	61	79	388,325	1,683,600,000	37.0
	• Buchan, 1974	8,700	9	9	22,199	51,378,213	33.0
	• Magnus, 1974	9,500	11	19	128,742	147,806,116	39.0
BRITOIL PLC	Thistle, 1973	9,000	33	46	60,378	294,904,274	38.0
	Beatrice A, 1976	6,750	17	25	28,415	62,755,583	39.0
	Beatrice B, 1976	6,500	8	10	13,954	14,303,819	39.0
	Deveron, 1972	9,000	2	2	6,393	6,029,459	38.2
	Clyde, 1978	12,400	...	...	...	...	...
CHEVRON	• Ninian, 1974	10,000	53	64	199,011	703,561,138	35.0
CONOCO	• Statfjord, 1974	9,500	51	82	*111,798	*151,802,212	39.0
	• Murchison, 1975	9,900	18	26	*57,063	*163,819,250	38.0
	• Hutton, 1973	10,000	13	23	75,616	57,673,000	33.0
	• Dunlin, 1973	9,100	21	32	42,138	235,386,000	36.0
HAMILTON BROS. OIL & GAS LTD.	• Argyll, 1971	9,000- 9,400	7	7	10,100	60,000,00	38.0
	• Duncan, 1980	9,600-10,000	4	4	7,700	14,700,000	36.0
	• Innes, 1983	12,300-12,600	2	2	4,800	3,300,000	45.0
MARATHON OIL COMPANY	• Brae South Crude Oil, 1975	12,700-13,437	13	22	104,500	106,317,470	35.0
MOBIL	• Beryl, 1972	9,900-11,500	38	46	95,005	321,716,733	37.4
OCCIDENTAL	• Claymore, 1974	8,100	26	27	77,315	281,735,000	30.1
	• Piper, 1973	8,100	23	27	172,362	749,895,000	37.0
	• Scapa, 1981	8,100	2	2	7,973	4,789,000	32.0
SHELL	• Auk, 1971	NA	9	11	10,560	72,654,000	38.0
	• Brent, 1971	NA	66	72	401,000	947,465,000	37.8
	• Cormorant S. & C., 1972	NA	11	13	45,350	79,153,000	36.0
	• Cormorant N., 1974	NA	11	15	101,580	129,977,000	34.9
	• Dunlin A, 1973	NA	21	27	40,200	231,873,000	36.0
	• Fulmar, 1975	NA	11	12	158,760	207,947,000	40.0
PHILLIPS	• Maureen, 1973	8,000- 8,700	3	12	64,658	88,979,420	36.0

		Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	TEXACO NORTH SEA	• Tartan, 1974	10,217-12,614	8	15	23,000	47,395,266	37.0-42.0
		• Highlander, 1976	8,759- 9,372	4	5	28,600	17,457,415	34.0-37.0
		• Petronella, 1975	8,110	1	1	687	250,871	40.1
	UNOCAL	• Heather, 1973	10,800	28	37	20,289	67,726,568	34.3
*U.K. production share		**Total United Kingdom**		710	1,012	2,581,555	7,186,474,700	
YEMEN, NORTH[e]	HUNT OIL	Alif, 1984	NA	45	45	10,000	NA	...
		Total North Yemen		45	45	10,000	NA	
VENEZUELA	PDV/ ANZOA-TEGUI	Boca, 1971	9,500	19	77	965	76,975,699	32.2
		Caico Seco, 1946	6,500- 7,300	22	104	2,994	66,363,821	33.1
		Chimire, 1948	7,000- 7,200	52	199	5,195	369,855,789	34.6
		Dacion, 1957	6,700	86	143	7,207	219,404,138	21.8
		Elias, 1954	5,000- 6,470	77	163	6,545	117,763,633	37.5
		El Robie, 1939	3,500-11,500	26	65	2,596	43,136,764	50.0
		Guara, 1946	5,000-10,000	186	372	17,256	565,967,286	25.7
		Inca, 1948	7,250	18	52	1,419	31,353,195	28.2
		Leona, 1938	2,200-12,800	87	303	9,277	191,942,461	24.7
		La Ceiba, 1946	9,450	27	36	2,358	46,744,003	42.4
		Mata, 1954	8,970-10,516	96	405	9,816	507,389,005	32.5
		Merey, 1937	5,400- 5,700	143	599	3,801	244,514,638	12.4
		Nipa, 1945	6,000- 8,500	62	301	15,310	508,525,895	28.0
		Oscurote-Norte, 1952	9,513	15	78	745	121,987,572	19.2
		Oficina, 1937	5,900	133	481	13,585	779,693,149	22.6
		Soto, 1950	9,500	10	76	1,790	164,260,467	37.8
		Sta. Ana, 1936	8,500	74	108	2,164	59,625,655	42.6
		San Joaquin, 1939	6,550	59	100	9,462	46,042,234	48.8
		Sta. Rosa, 1941	8,500	172	207	11,420	292,627,599	50.4
		Yopales, 1937	4,600	104	258	2,615	158,365,924	23.6
		Zanjas, 1958	13,270	11	17	2,615	35,993,342	41.0
		Zapatos, 1955	11,500	25	65	3,565	143,135,310	35.9
		Zorro, 1953	11,100	10	28	1,620	70,829,678	35.9
		Zulus, 1957	12,710	8	21	1,665	23,694,696	42.1
		Zumo, 1954	9,200	6	34	1,421	68,006,051	26.3
		La Ceibita, 1963	9,878	24	47	3,144	80,344,757	41.8
		Adjuntas, 1957	5,000	1	53	307	10,764,084	13.9
		Arecuna	1,300	17	116	3,398	7,238,191	11.2
		Bare	1,100	81	248	11,832	24,907,126	10.3
		El Toco, 1948	2,300	35	44	1,120	14,391,186	52.2
		Guario, 1940	3,400	17	61	1,607	25,824,591	43.8
		Isla, 1954	...	200	1,078	2,792	15,439,580	43.5
		Other	...	...	...	28,723	386,903,284	...
	PDV MONAGAS	Acema, 1960	...	29	58	37,643	45,084,539	29.0
		Aguasay, 1955	8,100-13,400	13	43	5,309	95,553,344	31.3
		Jobo, 1956	3,600- 4,000	102	432	29,928	255,453,735	11.0
		Morichal, 1958	3,312	18	191	4,646	168,931,207	8.7
		Orocual, 1953	2,954	17	51	3,630	28,050,916	25.1
		Oritupano, 1950	7,657	50	175	4,260	33,585,846	19.1
		Pirital, 1958	450- 1,100	42	81	702	27,069,238	30.2
		Quiriquire, 1928	7,000- 7,200	1	475	1,425	759,655,325	23.5
		Sta. Barbara, 1941	5,020- 6,500	40	316	1,143	166,888,311	24.2
		Tacat, 1953	1,820- 3,670	23	133	299	44,948,976	18.2
		Temblador, 1936	3,500- 4,500	6	48	1,374	108,875,519	19.5
		Aguasay N., 1955	4,849	6	7	5,552	3,422,603	45.4
		Acema-Casma	4,023	56	84	5,164	64,428,160	24.1
		Cerro Negro	1,200	23	297	14,606	15,894,104	8.6
		Mata Acema, 1951	...	25	62	8,519	85,147,488	24.0
		Onado, 1971	4,791	16	25	4,395	16,993,375	27.7
		Oritupano N., 1954	...	20	33	5,219	23,749,618	28.4
		Pilon, 1937	...	86	139	13,394	146,025,237	12.3
		Carisito	4,881	1	1	...	255,906	...
		Josepin, 1938	4,253	2	94	773	194,569,772	26.5
		Manresa, 1954	...	1	3	66	3,317,079	16.7
		El Furrial, 1986	...	2	2	3,218	1,174,459	26.8
		Other	...	12	225	3,799	118,942,583	...
	PDV/ZULIA	Boscan, 1946	9,708	89	389	36,449	719,717,348	10.4
		Bachaquero, 1930	10,720	1,344	3,759	255,572	6,276,285,818	23.2
		Cruces-Manueles, 1916	3,000- 8,000	35	133	2,619	175,255,977	39.2
		Cabimas, 1917	2,200	709	1,258	60,686	1,576,957,357	22.8
		Centro, 1959	9,600-11,000	195	248	215,465	794,851,525	36.2
		La Concepcion, 1953	3,148- 8,000	56	162	4,346	134,966,791	34.5
		La Paz, 1925	4,268- 8,000	57	156	11,285	850,745,548	30.6
		Lago, 1959	11,450	32	65	17,266	224,213,958	32.0
		Lagunillas, 1926	3,000	2,250	5,158	369,333	10,563,836,427	25.6
		Lama, 1957	8,320	248	400	129,903	2,485,058,736	32.5
		Lamar, 1958	13,000	107	184	67,098	1,085,863,418	35.5
		Mara, 1945	5,240	51	105	6,556	408,684,358	24.0

WORLDWIDE PRODUCTION

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	Mene Grande, 1914	4,130	238	584	6,883	634,097,101	18.4
	Motatan, 1952	...	17	30	15,800	64,245,260	20.2
	Sibucana, 1948	13,450	1	3	453	43,182,208	30.8
	Tia Juana, 1928	3,000	1,394	3,095	222,455	3,881,898,431	18.2
	Urdaneta, 1970	10,000	38	285	22,705	112,968,562	26.7
	West-Tarra, 1942	4,250- 5,500	17	44	2,505	71,282,806	39.2
	Ceuta	16,380	101	168	54,741	412,438,738	30.6
	Sur del Lago	17,830	4	5	128	324,043	33.6
	Other	...	43	124	87,974	92,130,705	...
PDV/BARINAS	Hato, 1965	9,550	13	18	2,081	42,095,485	24.4
	Maporal, 1957	10,950	14	14	3,051	13,454,261	26.7
	Paez, 1963	NA	57	67	9,202	57,441,699	19.6
	Silvan, 1949	10,860	21	22	4,194	47,064,669	29.0
	Silvestre, 1948	8,860	30	48	4,258	134,841,247	23.6
	Sinco, 1953	8,500- 9,100	57	84	9,891	254,147,675	23.7
	Other	...	4	9	4,018	6,297,830	25.9
PDV/FALCON	Hombre Pintado, 1927	...	...	50	...	8,489,429	24.2
	El Mene, 1921	...	...	45	...	778,077	38.1
	Media, 1928	...	...	4	...	30,173,477	38.1
	Tiguaje, 1953	...	5	23	218	10,122,325	27.6
	Las Palmas, 1928	...	...	13	...	443,963	29.0
PDV/GUARICO	Budare, 1958	4,523	22	41	4,010	57,539,444	29.6
	Las Mercedes, 1942	4,500	...	184	31	133,135,289	22.8
	Ruiz, 1949	4,500	7	42	133	33,140,920	29.9
	Barzo, 1959	...	3	6	245	2,209,631	29.0
	Bella Vista, 1952	...	11	86	136	12,312,672	21.6
	Jobal, 1960	...	7	12	143	1,835,855	36.3
	Saban, 1947	...	15	70	265	21,889,183	41.1
	Other	...	9	140	209	352,322,467	...
PDV/AMACURO	Tucupita, 1945	...	2	67	192	67,054,571	16.6
	Total Venezuela		**9,797**	**26,314**	**1,977,902**	**39,833,823,427**	
WEST GERMANY							
WINTERSHALL A.G.	Emlichheim, 1944	3,116-	74	130	3,448	42,238,997	24.5
	Ruehlertwist, 1949	2,919	72	134	1,919	30,340,916	25.0
	Aldorf, 1952	4,100	48	106	574	16,695,035	33.0
	Bockstedt, 1954	4,264	34	48	1,268	20,077,593	27.4
	Dueste, 1954	3,936	33	71	381	11,979,018	33.0
	Pattensen, 1954	2,165	5	7	62	1,016,330	29.3
	Landau, 1955	3,936	73	78	1,231	26,148,532	36.9
	Sohnedeneck, 1956	5,182	19	29	224	5,059,601	27.5
	Ruelzheim, 1984	7,544	2	2	1	40,751	37.7
	Rheinzabern, 1959	5,576	1	1	65	17,004	37.9
	Moenchsrot, 1958	5,248	15	23	296	10,342,375	38.1
	Kirchdorf, 1982	5,737	1	1	13	48,745	38.5
	Oberschnarzach, 1978	4,920	4	4	173	550,090	37.7
	Arlesried, 1964	4,920	11	20	636	13,613,363	38.5
	Maximiliansau, 1959	5,363	1	1	4	14,387	41.0
	Hauerz, 1985	8,639	5	5	271	133,996	40.4
	Meckelfeld, 1954	6,396	21	28	372	13,773	27.5
	Dickel, 1953	3,936	37	60	602	6,422,933	28.3
	Nienhagen, 1925	3,729	12	12	57	10,856,342	30.0
	Wathlingen, 1939	2,624	8	9	40	1,393,287	30.0
	Eicklingen, 1937	2,460	12	13	50	3,617,738	30.0
	Schwabmunchen, 1976	4,428	1	1	2	38,974	25.7
	Aitingen, 1977	6,232	4	4	1,234	3,537,398	31.1
DEUTSCHE TEXACO A.G.	Boostedt, 1952	5,900	27	43	762	17,936,880	32.0
	Ploen-Ost, 1958	8,850	30	63	1,112	50,293,120	33.0
	Preetz, 1962	8,200	22	30	371	11,401,670	26.0
	• Schwedeneck-See, 1978	4,900	15	15	7,713	4,788,540	28.0
	Hankensbuettel-Sued, 1954	4,900	46	85	2,950	80,950,880	27.0-35.0
	Hardesse, 1957	8,200	35	69	741	8,467,442	40.0
	Oerrel-Sued, 1954	4,600	25	46	1,115	11,009,350	26.0
	Hohne, 1951	5,250	29	55	866	40,335,040	33.0
	Lieferde, 1956	2,600	24	42	427	20,134,330	33.0
	Wesendorf, 1943	4,650	21	37	347	17,283,120	25.0-40.0
	Other, 1935-84	2,300- 8,200	23	69	541	30,324,970	19.0-37.0
MOBIL A.G.	Hofolding, 1980	11,100	3	3	577	630,184	28.0-30.0
	Bavaria	4,660- 6,190	15	31	94	7,526,758	20.0-25.0
	Hannover	980- 6,630	52	70	958	27,929,829	25.0-35.0
	Viogtei, 1953	980- 1,900	77	108	694	24,692,465	32.0-34.0
	Süd-Oldenburg, 1950	2,630- 6,800	85	157	1,214	39,085,351	31.0-39.0
	Weser Ems	2,000- 2,450	19	25	330	5,889,334	23.0
OTHER OPERATORS[e]	Georgsdorf, 1944	1,800- 2,600					24.0-29.0
	Meppen, 1960	4,000					28.0-30.0
	Ruehlermoor, 1949	2,000- 4,700					28.0-30.0
	Scheerhorn, 1949	3,550- 3,750					30.0
	Reitbrook, 1937	1,450- 2,100					29.0

PRODUCTION FACILITIES at Dhabi field in the Badin block in SE Pakistan are operated by Union Texas. Production from Union Texas joint-venture operations in Pakistan climbed from 4,200 gross barrels daily in 1982 to about 15,000 b/d from four fields.

WORLDWIDE PRODUCTION

	Name of field, discovery date	Depth, ft	No. of wells: Producing	No. of wells: Total	Production: 1986 average B/d	Production: Cumulative to Dec. 31, 1986 Bbl	°API gravity
	Eldingen, 1949	4,750					35.0
	Lueben, 1955	3,950					35.0-38.0
	Oelheim-Sued, 1968	7,650	2,088	2,088	45,505	409,990,545	33.0
	Ruehme, 1954	1,950					...
	Sinstorf, 1960	6,750- 7,150					...
	Suderbruch, 1949	3,750- 7,550					19.0-38.0
	Vorhop, 1952	2,950- 6,900					36.0
	Barenburg, 1953	2,300- 3,300					29.0
	Bramberge, 1958	2,560- 3,300					29.0
	Gross Lessen, 1969	3,300					...
	Wehrbleck, 1947	3,400					33.0
	Total West Germany		3,129	3,829	79,240	1,507,916,986	
ZAIRE							
CHEVRON	• GCO, 1970	7,000- 9,000	3	7	507	6,139,661	29.0
	• Mibale, 1973	5,000- 6,000	7	8	15,356	76,221,050	30.0
	• Mwambe, 1979	6,150	2	2	162	575,438	30.4
	• Motoba, 1976	11,098	2	2	1,430	654,244	44.3
	Lukami, 1983	12,400	5	5	4,170	5,120,824	35.0
	Libwa, 1981	5,500	...	2	...	...	33.0
ZAIREP (FINA)	East Mibale, 1978	6,000	...	1	....	397,000	34.0
	Kinkasi, 1972	3,700	40	42	3,800	5,147,000	31.0
	Liawenda, 1972	3,900	27	32	2,400	2,007,000	31.0
	Nsiamfumu, 1977	8,300	...	1	...	5,000	34.0
	Kifuku, 1983	3,400	1	1	40	28,000	31.0
	Makelekese, 1983	3,600	8	8	630	558,000	31.0
	Muanda, 1972	3,600	6	6	550	370,000	31.0
	Tshiende, 1978	6,000	3	4	3,440	2,220,000	34.0
	Total Zaire		104	121	32,485	99,443,217	

USSR

Field, year discovered	No. wells	1987 prod. (million bbl)	Cum. prod. 1-1-88 (million bbl)	Pay, ft.
Arlan, 1955	3,600	50	2,450	Carb., 4,429
Baku Archipelago, 1963	230	18	470	Pliocene, 8,773
Fedorovskoye, 1971	2,000	250	2,400	L. Cret., 5,900
Kholmogorskoye, 1973	1,000	100	550	L. Cretaceous
Mamontovo, 1965	1,750	200	2,230	Cretaceous, 6,300
Neftianye Kamni, 1949	1,115	16	1,115	Pliocene, 5,406
Pravdinsk, 1964	600	50	920	L. Cret., 9,580
Romashkino, 1948	7,500	320	14,000	Devonian, 5,791
Samotlor, 1965	5,500	1,000	13,825	L. Cret., 7,316
Sovetskoye, 1962	400	40	920	Cret., 11,130
28th of April, 1979	50	37	110	Pliocene, 11,000
Usa, 1963	1,250	100	1,040	Paleozoic, 6,510
Ust-Balyk, 1961	1,150	70	1,660	L. Cret., 8,845
Uzen, 1961	2,100	65	1,625	Jurassic, 2,667

U.S. fields with reserves exceeding 100 million bbl

State Field	Disc. date	1987 prod.	Cum. prod. 1-1-88	Est. rem. reserves	Est. No. wells
			1,000 bbl		
ALABAMA					
Citronelle	1955	2,021	146,034	8,820	446
ALASKA					
Endicott	1978	7,000	7,000	368,000	20
Granite Point	1965	2,685	106,748	19,000	28
Kuparuk River	1969	99,595	391,342	1,107,000	332
Lisburne	1967	16,341	21,000	190,289	42
McArthur River	1965	7,300	522,000	42,000	75
Middle Ground Shoal	1962	2,800	153,152	8,000	41
Prudhoe Bay	1967	571,000*	5,500,000†	4,110,000	665
Swanson River	1957	2,012	207,336	8,000	27
ARKANSAS					
Smackover	1922	3,239	554,243	11,761	2,100
CALIFORNIA					
San Joaquin Valley					
Belridge South	1911	64,060	616,500	495,869	5,391
Buena Vista	1909	1,540	645,700	39,845	825
Coalinga	1890	10,400	743,633	171,400	2,209
Coalinga Nose	1938	1,350	497,400	10,168	78
Coles Levee North	1938	465	159,990	3,190	85
Cuyama	1949	522	217,722	7,407	101
Cymric	1909	6,900	190,829	38,300	954
Edison	1928	1,510	132,921	28,140	675
Elk Hills	1911	40,650	854,230	618,920	1,079
Fruitvale	1928	666	114,976	14,286	300
Greeley	1936	256	112,410	2,000	31
Kern Front	1912	1,710	171,566	57,360	850
Kern River	1899	45,350	1,157,580	790,000	6,260
Kettleman North Dome	1928	189	456,476	1,150	45
Lost Hills	1910	5,340	172,666	67,230	1,620
McKittrick	1896	2,900	264,271	93,470	980
Midway-Sunset	1894	57,900	1,821,850	431,360	9,100
Mount Poso	1926	7,070	256,630	85,900	415
Rio Bravo	1937	185	115,900	1,470	18
Yolumne	1974	8,010	74,798	33,585	64
Coastal Area					
Cat Canyon E. & W.	1908	2,934	285,500	49,666	515
Carpinteria	1966	2,680	85,400	70,970	113
Dos Cuadras	1969	4,789	208,433	58,511	140
Elwood	1928	369	105,388	2,600	7
Hondo	1969	9,930	79,669	122,180	22
Orcutt	1901	967	164,968	11,144	150
Point Arguello	1981§	—	—	500,000	—
Point Pedernales	1982¶	5,200	5,200	345,000	10
Rincon	1927	1,180	147,641	15,950	230
San Ardo	1947	4,960	403,710	127,544	507
Santa Maria Valley	1934	1,920	196,380	42,159	165
South Mountain	1916	738	145,257	12,762	360
Ventura	1919	7,290	887,670	104,098	530
Los Angeles Basin					
Beta	1976	6,957	34,410	179,838	58
Beverly Hills	1900	2,240	120,582	44,390	115
Brea Olinda	1880	2,280	381,751	56,930	730
Coyote East	1909	629	108,079	13,796	110
Coyote West	1909	832	249,161	8,289	117
Dominguez	1923	607	268,659	8,055	111
Huntington Beach	1920	6,050	1,060,552	77,860	930
Inglewood	1924	3,080	342,663	56,939	384
Long Beach	1921	2,350	907,291	19,682	325
Montebello	1917	521	191,831	2,893	150
Richfield	1919	1,630	187,671	28,906	216
Santa Fe Springs	1919	1,040	612,090	10,023	151
Seal Beach	1924	949	201,659	22,853	172
Torrance	1922	1,710	210,390	37,180	332
Wilmington	1932	32,260	2,262,308	525,554	1,870
COLORADO▪					
Rangely	1933	11,815	726,981	13,185	485
FLORIDA					
Jay	1970	3,900	355,914	60,620	119
ILLINOIS					
Clay City	1938	3,000	391,412	4,500	2,600
Lawrence	1906	3,000	391,602	4,500	2,700
Louden	1938	1,100	386,892	4,900	1,340
Main	1906	2,000	231,207	2,500	3,356
New Harmony	1939	1,000	152,473	2,000	1,140
Salem	1938	2,000	384,816	3,000	1,325
KANSAS▪					
Bemis-Shutts	1928	1,238	243,078	3,574	973
Chase-Silica	1931	1,071	268,764	3,517	1,103
Eldorado	1917	909	295,197	3,455	822
Hall-Gurney	1931	1,133	144,645	4,083	1,130
Trapp	1937	1,153	224,688	3,843	1,000
LOUISIANA					
Onshore South					
Bay de Chene	1941	158	95,992	18,342	40
Bay St. Elaine	1928	427	164,487	25,613	19
Bayou Sale	1941	714	160,600	4,186	23
Black Bay, West	1953	2,373	142,828	12,403	68
Caillou Island	1930	2,280	599,923	76,328	144
Cote Blanche Bay, West	1940	720	180,853	47,115	102
Delta Farms	1944	240	115,058	7,312	24
Garden Island Bay	1934	1,680	219,855	33,360	149
Golden Meadow	1938	660	134,545	5,184	175
Grand Bay	1938	593	170,060	4,214	61
Hackberry East	1927	950	108,310	8,380	74
Hackberry West	1928	2,202	140,124	8,263	123
Iowa	1931	169	99,169	831	23
Jennings	1901	360	116,094	1,000	173
Lafitte	1935	1,624	253,639	11,215	108
Lake Barre	1929	1,054	203,082	21,002	47
Lake Pelto	1929	534	116,523	17,892	26
Lake Washington	1931	3,228	240,037	18,729	93
Leeville	1931	742	141,199	7,668	39
Paradis	1939	843	125,525	9,325	33
Quarantine Bay	1937	661	171,911	2,415	43
Timbalier Bay, Onshore	1938	819	271,342	24,590	77
Venice	1937	833	181,020	8,449	51
Vinton	1910	438	136,749	1,000	127
Weeks Island	1945	1,227	225,123	22,172	36
West Bay	1940	1,709	226,897	17,704	86
North					
Caddo-Pine Island	1905	3,802	357,589	16,198	11,287
Delhi	1944	969	211,034	35,324	98
Haynesville	1921	870	167,476	3,134	177
Homer	1919	427	97,941	2,342	182
Rodessa	1935	234	105,696	1,837	68
Offshore					
Bay Marchand Blk. 2	1949	6,130	591,425	59,305	106
Eugene Island Blk. 330	1930	9,049	251,221	63,779	163
Grande Isle Blk. 16	1948	2,982	262,070	87,304	49
Grand Isle Blk. 43	1956	6,161	267,944	90,000	147
Mississippi Canyon Blk. 194	1980	11,151	111,939	81,240	48
Main Pass Blk. 41	1957	2,746	234,869	26,369	109
Main Pass Blk. 69	1948	2,600	234,240	87,760	40
Main Pass Blk. 306	1969	2,244	200,093	80,111	99

*Includes about 26.28 million bbl of condensate. †Includes about 108 million bbl of condensate.

§First production due in first half 1988. ¶Started up in April 1988.

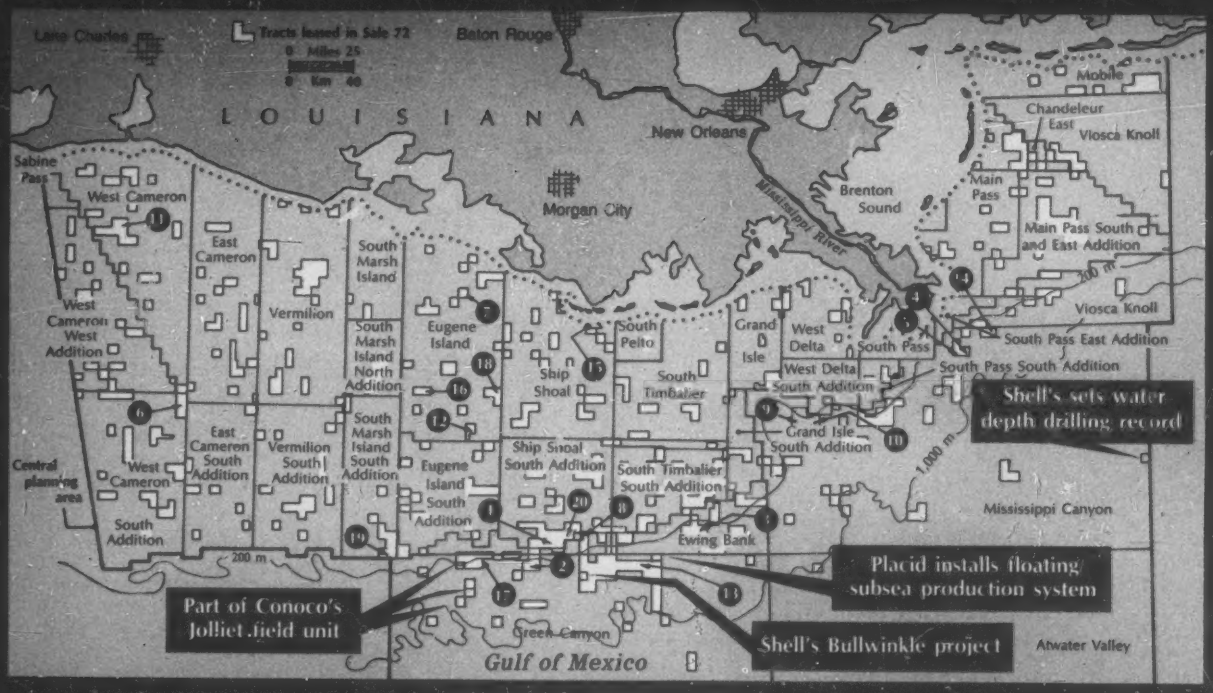
State	Field	Disc. date	1987 prod.	Cum. prod. 1-1-88	Est. rem. reserves	Est. No. wells
				1,000 bbl		
	South Pass Blk. 24,	1950	2,291	460,831	29,709	159
	South Pass Blk. 27,	1954	1,993	123,658	74,857	122
	South Pass Blk. 61,	1968	8,564	144,011	41,436	137
	South Pass Blk. 62,	1965	2,584	103,033	84,925	65
	South Pass Blk. 65,	1969	2,576	96,843	93,284	53
	Ship Shoal Blk. 204,	1968	1,833	64,479	40,521	33
	Ship Shoal Blk. 207,	1967	1,566	86,795	40,000	36
	Ship Shoal Blk. 208,	1962	4,459	156,052	69,391	63
	South Timbalier Blk. 21,	1939	2,534	214,915	48,457	50
	South Timbalier Blk. 135,	1956	966	137,947	27,053	36
	West Delta Blk. 30,	1949	7,664	439,329	54,129	142
	West Delta Blk. 73,	1962	3,809	184,231	90,760	74
MISSISSIPPI						
	Baxterville,	1944	3,228	236,555	13,000	318
	Heidelberg,	1944	3,535	171,980	15,000	316
	Tinsley,	1939	969	218,843	4,031	182
MONTANA▪						
	Bell Creek,	1967	1,071	129,698	23,942	174
	Cut Bank,	1926	1,012	161,401	38,163	660
	Pine,	1951	1,423	103,827	6,989	105
NEW MEXICO						
	Denton,	1949	772	138,041	1,661	130
	Empire-Abo,	1957	1,659	218,559	51,441	190
	Eunice-Monument,	1929	2,952	122,914	13,394	1,000
	Hobbs,	1928	8,402	289,002	18,000	410
	Maljamar,	1926	1,853	143,092	6,939	760
	Vacuum,	1929	12,569	419,883	48,000	1,000
NORTH DAKOTA▪						
	Beaver Lodge,	1951	1,771	109,612	18,388	129
	Billings Nose,	1978	2,190	51,578	54,304	109
	Little Knife,	1977	3,684	39,129	61,316	142
	Mondak,	1976	374	16,674	83,326	100
OKLAHOMA▪						
	Burbank,	1920	1,157	534,182	9,512	1,105
	Eola-Robberson,	1947	878	132,378	8,956	603
	Fitts,	1933	3,049	189,141	5,951	589
	Glenn Pool,	1905	1,223	326,695	3,925	714
	Golden Trend,	1945	4,782	455,191	15,218	1,396
	Healdton,	1913	1,603	339,173	11,501	1,000
	Hewitt,	1919	2,037	270,050	16,767	923
	Oklahoma City,	1928	569	741,140	6,768	174
	Postle,	1960	1,035	105,871	16,137	226
	Sho-Vel-Tum,	1914	16,761	—	60,000	7,616
	Sooner Trend,	1965	4,081	298,731	20,000	4,746
TEXAS						
	District 2					
	Greta,	1933	744	146,822	13,278	118
	Lake Pasture,	1953	1,932	85,600	14,828	113
	Tom O'Connor,	1934	9,648	737,468	63,532	667
	West Ranch,	1938	2,856	377,394	11,144	318
	District 3					
	Anahuac,	1935	1,236	283,820	16,180	107
	Conroe,	1931	4,308	723,351	37,592	276
	Giddings,	1971	9,300	269,702	156,900	2,349
	Hastings,	1934	4,000	694,153	75,848	211
	Magnet Withers,	1936	1,704	109,076	6,000	165
	Oyster Bayou,	1941	840	159,340	18,960	34
	Thomson,	1931	3,540	468,568	31,332	264
	Tomball,	1933	400	120,656	10,268	82
	Webster,	1937	5,556	567,888	20,000	183
	District 4					
	Agua Dulce-Stratton,	1928	300	146,263	25,111	148
	Borregos,	1945	300	113,829	20,378	47
	Kelsey,	1938	300	114,659	36,447	63
	Plymouth,	1935	300	122,423	3,700	65
	Seeligson,	1938	300	270,907	55,700	71
	TCB,	1944	800	112,244	52,814	34
	White Point, E.,	1938	200	103,974	6,400	53
	District 5					
	Alabama Ferry,	1983	3,612	11,000	90,000	166
	Van,	1928	3,000	518,864	13,112	359
	District 6					
	East Texas,	1930	40,000	4,968,150	1,029,355	9,508
	Fairway,	1960	3,000	190,267	20,201	98
	Hawkins,	1940	9,384	813,400	50,616	471
	Neches,	1953	1,548	102,564	7,452	157
	Quitman,	1948	1,620	119,666	10,120	193
	District 8					
	Andector,	1946	2,748	180,388	8,000	34
	Block 31,	1945	3,516	216,512	12,140	287
	Cowden, N.,	1930	12,480	474,496	40,000	1,255
	Cowden, S., Foster, Johnson,	1932	9,108	491,100	40,000	1,649
	Dollarhide,	1945	2,208	191,212	14,016	195
	Dune,	1938	2,748	180,072	21,632	780
	Fullerton,	1942	7,152	340,748	25,000	888
	Goldsmith,	1934	7,000	748,268	41,000	2,169
	Howard Glasscock,	1925	5,184	398,664	30,000	2,205
	Iatan, E.,	1926	3,000	139,584	10,000	1,263
	Jordan,	1937	1,056	128,496	3,000	256
	Keystone,	1930	1,836	311,208	11,246	845
	McElroy,	1926	5,316	457,665	64,684	1,501
	Means,	1934	6,168	221,578	24,000	730
	Midland Farms,	1944	4,776	237,372	23,224	423
	Sand Hills,	1931	2,640	245,447	24,360	1,320
	TXL,	1944	1,380	261,512	7,620	500
	Waddell,	1927	600	100,004	4,500	186
	Ward Estes, N.,	1929	3,156	360,769	79,844	1,502
	Yates,	1926	34,764	1,138,280	816,225	1,125
	District 8-A					
	Anton-Irish,	1944	3,780	172,346	27,754	245
	Cogdell Area,	1949	1,680	266,372	42,860	103
	Diamond M,	1948	1,896	237,510	17,971	499
	Kelly-Snyder,	1948	12,000	1,223,370	126,630	828
	Levelland,	1938	16,188	466,816	55,000	3,028
	Prentice,	1951	5,076	154,820	20,000	407
	Salt Creek,	1950	7,200	236,936	22,956	150
	Seminole,	1936	14,532	507,764	36,000	621
	Slaughter,	1936	18,576	1,009,436	50,000	2,983
	Spraberry Trend,	1951	19,776	631,176	50,000	7,167
	Wasson,	1936	33,744	1,683,242	50,000	2,201
	Welch,	1942	3,216	140,904	14,736	655
	District 10					
	Panhandle,	1921	7,224	1,415,474	49,052	11,630
UTAH▪						
	Altamont,	1955	3,010	84,698	234,263	241
	Aneth,	1956	5,300	349,005	30,000	450
	East Anschutz Ranch,	1979	14,717	63,910	740,555	6
	Pineview,	1975	603	26,719	119,405	18
	Red Wash,	1951	1,148	124,107	14,452	141
WYOMING▪						
	Brady,	1960	2,789	54,019	51,689	21
	Byron,	1918	1,295	119,667	8,775	65
	Elk Basin,	1915	2,774	499,203	28,718	155
	Frannie,	1928	1,338	115,194	6,000	88
	Garland,	1906	2,486	152,486	6,000	232
	Grass Creek,	1914	2,418	182,715	11,059	269
	Hamilton Dome,	1918	2,982	265,233	6,000	225
	Hartzog Draw,	1976	6,851	60,000	290,386	153
	Hilight,	1969	532	74,822	56,426	98
	Lance Creek,	1918	112	107,777	400	22
	Little Buffalo Basin,	1914	2,945	114,945	12,055	149
	Lost Soldier,	1916	2,142	189,588	6,000	76
	Oregon Basin,	1912	9,149	379,690	30,000	495
	Painter Reservoir,	1979	2,145	43,929	82,413	47
	Salt Creek,	1906	4,747	624,238	20,253	1,105
	Whitney Canyon-Carter Creek,	1980	1,777	8,341	107,137	25

▪Production data from Petroleum Information.

Production depth records in U.S.

State, area	Well	Location	County Parish	Year	Deepest perf	Pay zone
Texas	Chevron 1-21 Ruth Ledbetter	21-L-J.M. Lindsay	Wheeler	1977	26,536	Ellenburger gas
Oklahoma	Leede Oil & Gas 1-29 McCall	29-11n-25w	Beckham	1985	25,000	Hunton gas
Wyoming	Monsanto Oil 1-5 Bighorn	5-38n-90w	Fremont	1985	23,902	Madison & Bighorn gas
Louisiana	Texaco 1 S.L. 4666	Caillou Island	Terrebonne	1969	21,862	Miocene oil
Alabama	Exxon 1 OCS-G-5066	Block 867	Off Mobile	1984	21,838	Norphlet gas
Mississippi	Shell Oil 5-A Cox	29-3n-3e	Rankin	1976	21,727	Norphlet gas
Calif. offshore	Texaco 3 OCS-P-0234	Pitas Point	. . .	1977	18,309	Gas
California	Tenneco 66X Tenneco-Union-GBP	3-27s-22e	Kern	1975	18,060	Vedder oil
Utah	Gulf Oil 1-34-Z-3 Ute Tribal	34-1n-3w	Duchesne	1974	17,732	Wasatch oil
Colorado	Champlin 44-27 Shell Creek	27-12n-99w	Moffat	1977	17,632	Nugget gas
New Mexico	Union Oil 1 Red Hills Unit	32-25s-33e	Lea	1964	17,544	Devonian gas
Florida	Exxon 13-3 St. Regis	13-4n-29w	Santa Rosa	1972	16,130	Norphlet oil
Alaska	Marathon Oil 4 Beaver Creek	Seward Meridian	. . .	1973	14,952	Tyonek oil
North Dakota	Patrick Petroleum 1-17 Enderud	17-152n-98w	McKenzie	1981	14,636	Red River gas
West Virginia	Exxon 1 McCoy	Washington dist.	Jackson	1975	14,300	Rome gas
Pennsylvania	Texaco 1 S.T. 289	Slate Run quad.	Lycoming	1985	13,186	Ordovician gas
Montana	Sun Oil 1 Panasuk	20-29n-59e	Roosevelt	1980	13,012	Red River oil
Michigan	Federated Nat'l Resources 1 Metz	15-16n-4e	Bay	1987	11,768	Prairie du Chien gas
Arkansas	W.H. Hunt 1 Nations	4-20s-22w	Columbia	1969	11,195	Smackover gas
South Dakota	Depco Inc. 41-22 Otterness	22-23n-5e	Harding	1973	9,150	Red River oil
Maryland	Cumberland & Allegheny 604 Smith-Kerr Unit	. . .	Garrett	1966	8,658	Oriskany gas
Nevada	Texota 1-34 Eagle Springs Unit	34-9n-57e	Nye	1967	8,581	Tertiary oil
Ohio	Gas Corp. of America 1 Danford	Noble twp.	Noble	1973	8,488	Rose Run gas
Nebraska	Miller Oil 2-A Prairie State	16-13n-56w	Kimball	1987	8,457	Wolfcamp oil
Kentucky	Inland Gas Corp. 529 White	. . .	Boyd	1967	7,598	Antietam oil
Virginia	Clinchfield Coal Co. 193	. . .	Dickenson	1957	7,238	Devonian shale gas
Arizona	Texaco 1-Z Navajo	36-41n-30e	Apache	1960	6,793	Devonian oil
Kansas	3 Cunningham	13-34s-37w	Stevens	1967	6,774	St. Louis gas
New York	Transamerican Petroleum 1 Wellman	Middlebury twp.	Wyoming	1963	5,425	Theresa gas
Illinois	Moore Engineering 8 Gray Estate	30-3s-8e	White	1980	5,405	Devonian oil
Tennessee	Amoco-Anschutz 1 Reed Unit	10-1s-74e	Hancock	1981	4,624	Knox gas
Indiana	V.R. Gallagher 1 Chilton	3-5s-14w	Posey	1977	4,508	Harrodsburg oil
Washington	J.W. Tanner-Sunshine Mining 1 Medina	. . .	Grays Harbor	1957	4,118	Miocene oil
Oregon	American Quasar 9-12 Hicken	Lebanon field	Linn	1981	3,027	Eocene gas
Missouri	William Gruenerwald & Assoc. 1 Currie	21-63n-40w	Holt	1959	2,975	Ordovician oil

What has happened on tracts leased in Sale 72*



Action on Sale 72's top 20 tracts

Rank	Block	Operator	Cash bonus (Million $)	Status
1	Ship Shoal South Addition 367	Mobil	92.36	Two dry holes drilled. Lease will be dropped.
2	Green Canyon 60	Mobil	75.15	Three wells drilled with at least one encountering hydrocarbons. No well completions. 3D survey has been completed. Development under review.
3	Ewing Bank 915	Mobil	75.11	Two wells drilled with at least one encountering hydrocarbons. No well completions. 3D survey has been completed. Development is expected.
4	Mississippi Canyon 110	Standard	72.31	Three wells drilled. No well completions. 3D survey has been completed. Development under review.
5	Mississippi Canyon 109	Standard	50.32	Two wells drilled with at least one encountering hydrocarbons. No well completions. 3D survey has been completed. Development under review.
6	West Cameron South Addition 458	FMP	41.78	Four wells drilled with at least one encountering hydrocarbons. No well completions. Development under review. Lease taken in farmout from Texaco group.
7	Eugene Island 85	Amoco	41.25	Two wells drilled and completed. One completion abandoned. Platform installed mid-1985. As of mid-1987, no production from the block.
8	Ewing Bank 944	Mobil	37.68	Three wells drilled with at least one encountering hydrocarbons. No well completions. 3D survey completed. Unitized with Ewing Bank 988. Development is likely.
9	Mississippi Canyon 400	Amoco	31.73	Two wells drilled with at least one encountering hydrocarbons. No well completions. Unitized with Mississippi Canyon 401. Development is likely.
10	Mississippi Canyon 402	Amoco	31.66	MMS records unclear as to well data on this block. Amoco declined comment.
11	West Cameron 168	Tenneco	31.53	One well drilled and completed, although completion has been abandoned. Platform set in mid-1987. No production. Lease taken in farmout from Amoco.
12	Eugene Island 253	Exxon	30.40	Three wells drilled with at least one encountering hydrocarbons. No well completions. Lease covers only portion of block. Development under review.
13	Green Canyon 72	Mobil	30.22	Two wells drilled with at least one encountering hydrocarbons. No well completions. Operator to try to perpetuate lease.
14	Mississippi Canyon 24	Chevron	28.80	No wells drilled.
15	Ship Shoal 65-66	—	26.72	MMS rejected 1983 bid from Chevron-Sonat-Kerr-McGee. Same group paid $46 million in 1984 to lease tract.
16	Eugene Island 203	Exxon	26.36	Dropped in mid-1985.
17	Green Canyon 10	Chevron	25.77	One well drilled. No completions. Unitized with Green Canyon 9.
18	Eugene Island 211	Union	25.28	Only producing lease in top 20. One well drilled and completed. Platform installed in mid-1985 on adjacent Eugene Island 212. Produced 4,608 bbl of oil and condensate, 36.048 Mcf of gas, and 14 bbl of water during 17 day period in July 1987.
19	South Marsh Island South Addition 205	Mobil	25.21	Two wells drilled with at least one encountering hydrocarbons. No well completions. Operator to try to perpetuate lease.
20	Ship Shoal South Addition 358	Mobil	24.24	Two wells drilled. No well completions. Another well is likely.

*As of August 1987
Source: Minerals Management Service

Mobile Bay well history

Block	Well number	Total depth (ft)	Flow rate (MMcfd)
ALABAMA (STATE WATERS)			
18	2	11,020	*
37	1	10,027	*
62	1	20,822	20.5
63	1	21,000	28.0
64	1	21,030	†
72	1	21,315	21.2
76	1	21,113	12.2
76	2	20,981	†
77	1	20,984	19.4
77	2	21,710	†
77	4	3,075	†
89	1	22,189	*
91	1	21,818	*
94	2	21,859	15.5
95	1	20,949	10.5
95	2	3,058	4.0
97	1	21,558	*
112	1	21,887	22.5
113	1	22,390	13.7
114	1	22,160	1.2
115	1	21,678	9.4
MOBILE (FEDERAL WATERS)			
821	1	21,883	23.0
822	1	21,995	†
823	1	21,736	15.5
826	1	21,728	*
827	1	21,793	36.4
861	1	21,645	11.2
862	1		§
863	1	3,050	†
864	1	3,050	*
866	1		§
867	1	22,422	24.0
868	1	22,488	†
870	1		§
908	1	3,145	*
908	2	4,097	†
913	1	22,041	*
914	1	4,611	†
952	1	4,270	*
953	1	3,620	*
955	1	4,120	*
991	1	4,960	*
991	2		§
996	1	5,705	*
1006	1	23,153	*
VIOSCA KNOLL (FEDERAL WATERS)			
117	1	25,000	*
203	1	5,200	†
203	2	5,200	†
203	3	4,200	†
203	4	5,000	†
PENSACOLA (FEDERAL WATERS)			
973	1	23,264	*

*Dry hole. †Not flow tested. §Drilling as of yearend 1987.

serves, so there will be only marginal returns on investment.

During the remainder of 1987 and early 1988, a lot of the activity will be fueled by the threat of lease expirations.

For instance, Anadarko anticipates that it will double its drilling in the gulf because, among other things, it has a large number of high quality prospects in inventory that are in danger of lease expiration.

Once the threat of lease expiration is passed, the drilling recovery is going to have to be driven by market forces. The recovery might be short lived unless there is some wellhead gas price improvement to the $2.50-3/Mcf range.

Some companies, however, believe that gas prices will rise and are preparing.

Deepwater plays

Significant exploration/development activities continue along the gulf's continental slope in deep waters and the burgeoning Jurassic Norphlet deep gas play in shallow waters off Alabama.

Several worldwide drilling records were established in the two plays, and billions of dollars were committed to exploration/production projects.

Shell shattered the world water depth drilling record, a Placid group established a water depth production record, and a Conoco group moved to install the world's first TLWP.

Shell's drilling record

Shell shattered the world water depth drilling record with a wildcat that Sonat Inc.'s Discoverer Seven Seas drillship spudded in 7,520 ft of water on Mississippi Canyon Block 657.

The well, which was in water that is almost six times deeper than the world water depth record for a well completion, tested a structure underlying Mississippi Canyon Blocks 612, 613, 656, and 657.

The well surpassed the previous world mark of 6,952 ft of water, set by a Shell group wildcat that was abandoned as a dry hole in 1984 on Wilmington Canyon Block 372 off New Jersey.

Shell acquired 100% interests in Mississippi Canyon 612, 613, 656, and 657 for about $4 million during the 1986 central gulf area-wide lease sale. The company leased 19 other blocks in the area during the 1987 area-wide lease sale.

As of the start of 1988, the only other lessees in the area were Texaco Producing Inc. and Conoco Inc. The Texaco and Conoco holdings, however, were small compared with Shell.

Shell also held the previous water depth drilling record in the Gulf of Mexico. The company drilled a wildcat in 6,570 ft of water that reached total depth in midyear last year on Atwater Valley Block 471. Shell has not disclosed results of the Atwater Valley test.

Discoverer Seven Seas was used to drill all the wells.

Shell declines to disclose the exact nature of its eastern Mississippi Canyon prospect, which it identified through seismic surveyes. However, the company said, the geology appears to be different from the postulated giant overthrust structure tested with the company's Atwater Valley well.

Placid's deepwater system

The Placid group, slowed earlier in the year by Placid financial problems, moved aggressively at the end of 1987 to complete work on its innovative deepwater floating/subsea production system on Green Canyon Block 29.

The converted semisubmersible that will be the surface platform for the was anchored late last year.

The Placid group immediately began work to level the project's subsea template, which was installed earlier in 1987. After the template was leveled, the project's unique production riser was barged to the site and installed.

The Placid group was shooting for production startup during this year's first half.

The project, which features a floating drilling/production platform, a free standing rigid riser, a 24 slot subsea drilling/production template, and a shallow water final cut processing platform, is designed to tap Pliocene/Pleistocene oil and gas reserves underlying Green Canyon Blocks 29 and 31 and Ewing Bank Block 999.

pipelines 32 in. in diameter or larger, which are assumed to be solely onshore projects.

Here is a breakout of cost projections:

- Total construction onshore for 1988 will reach $6.076 billion.

This total includes $2.25 billion for 4—10-in. pipelines, $1.053 billion for 12—20-in. pipelines, $1.209 bilion for 22—30-in. pipelines, and $1.564 billion for 32-in. pipelines and larger.

- Total construction offshore for 1988 will reach $585.2 million.

This total includes $292.2 million for 4—10-in. pipelines, $136.2 million for 12—20-in. pipelines, and $156.8 million for 22—30-in. pipelines.

- Total construction onshore for 1988 and beyond will reach $18.426 billion.

This total includes $4.732 billion for 4—10-in. pipelines, $3.461 billion for 12—20-in. pipelines, $3.361 billion for 22—30-in. pipelines, and $6.872 billion for pipelines greater than 32 in. in diameter.

- Total construction offshore for 1988 and beyond will reach $1.499 billion.

This total includes $614.1 million for 4—10-in. pipelines, $449 million for 12—20-in. pipelines, and 436 million for 22—30-in. pipelines.

Much of the non-Communist world's planned gas-line construction involves expansions to serve new markets or new supply regions.

Competition is particularly fierce in the U.S., where pipelines are scrambling to be transporters for growing electric-power-generating markets in the Northeast and Florida and thermal enhanced oil recovery markets in California.

Non-Communist pipeline construction in 1988 and beyond*

	†4-10 in.	12-20 in.	22-30 in.	Larger than 30 in.	Total
			Miles		
GAS PIPELINES					
U.S.	1,667	1,349	1,568	2,800	7,384
Canada	996	347	522	1,372	3,237
Latin America	1,386	374	645	433	2,838
Asia-Pacific	378	196	962	1,016	2,552
West Europe	279	556	221	1,306	2,362
Middle East	39	6	28	619	692
Africa	53	45	—	286	384
Total gas	**4,798**	**2,873**	**3,946**	**7,832**	**19,449**
CRUDE PIPELINES					
U.S.	439	287	805	1,030	2,561
Canada	114	55	—	—	169
Latin America	73	655	35	246	1,009
Asia-Pacific	47	95	—	—	142
West Europe	9	109	—	6	124
Middle East	—	43	143	602	788
Africa	239	48	76	—	363
Total crude	**921**	**1,292**	**1,059**	**1,884**	**5,156**
PRODUCT PIPELINES					
U.S.	499	510	—	—	1,009
Canada	2	—	—	—	2
Latin America	610	331	—	—	941
Asia-Pacific	135	—	—	—	135
West Europe	17	126	275	—	418
Middle East	—	—	—	—	—
Africa	453	306	—	—	759
Total product	**1,716**	**1,273**	**275**	**—**	**3,264**
NON—COMMUNIST WORLD TOTALS					
Gas	4,798	2,873	3,946	7,832	19,449
Crude	921	1,292	1,059	1,884	5,156
Product	1,716	1,273	275	—	3,264
Total	**7,435**	**5,438**	**5,280**	**9,716**	**27,869**

*Projects planned and under way in 1988 and scheduled for completion beyond 1988.
†Includes some projects of less than 4 in. diameter.

U.S. Northeast markets

The FERC was deluged in January with pipeline proposals to serve new gas markets in the U.S. Northeast and Eastern Seaboard regions. Last summer the FERC had set Jan. 15 as the deadline to file proposals under an "open season" solicitation and received more than 40 applications from more than 20 pipelines.

Texas Eastern Transmission Corp., CNG Transmission Corp., ANR Pipeline Co., Tennessee Gas Pipeline Co., Panhandle Eastern Corp., Transcontinental Gas Pipe Line Corp., and National Fuel Gas Co. provided details of their proposed projects. It is unknown how many of the proposals, if any, will eventually be accepted by FERC.

Meanwhile, Northern Border Pipeline Co. asked FERC to approve extension and expansion of its system in a $534-million project designed to move more Williston basin and Canadian gas to U.S. Midwest and Northeast markets.

The company would expand capacity of its 822-mile main system from Port of Morgan, Mont., to Ventura, Iowa, to 2 bcfd from the present 1.15 bcfd by adding four compressor stations and additional compression at two existing stations.

It also planned to lay 371 miles of 36-in. line and build six compressor stations between Ventura and Tuscola, Ill., where it would connect with Panhandle Eastern Pipe Line Co. and Trunkline Gas Co.

Shell Canada Ltd. and Granite States Gas Transmission Inc., after receiving approval from U.S. and Canadian agencies, began a project to convert to gas service an idle crude-oil pipeline between Montreal, Que., and Portland, Me.

Granite is to construct a connection between the converted oil line and its existing gas-transmission system at Portland. Full service of 25 MMcfd will begin Nov. 1.

Florida markets

Florida Gas Transmission Co. and Coastal Corp. have been fighting for incremental new gas markets expected in Florida.

Florida Gas, the only gas supplier to peninsular Florida, last year received FERC approval to expand by 100 MMcfd the capacity of a section of its gas pipeline between Baton Rouge, La., and Miami, Fla. Florida Gas also applied for FERC approval of a second 100-MMcfd expansion.

Florida Gas, meanwhile, planned a third phase, 300-600 MMcfd system expansion to serve new Central Florida markets. Formal sales negotiations began earlier this year.

The expansion would involve looping the system with 30-in. pipe from a proposed hookup with the Mobile Bay production region to Perry, Fla. At that point, a new mainline would be laid south along Florida's West Coast to Fort

Myers. The line then would cross Florida for a terminus along the state's East Coast in the Miami area.

Meanwhile, Sunshine Natural Gas System, a subsidiary of Coastal, asked FERC last year for approval to lay and operate a 608-mile pipeline to move Mobile Bay gas across the gulf to the same Central Florida markets.

The $470-million Sunshine line, slated for completion late in 1991, would move as much as 450 MMcfd on a contract transportation basis to the same markets. Sunshine would consist of a 392-mile offshore segment of 30-in. pipe from gas-processing plants in Mobile County, Ala., to Pasco County, Fla., just north of Tampa.

The 216-mile onshore Florida segment would consist of 76 miles of 30-in. pipe in Manatee County and 140 miles of 24-in. pipe to Martin County. Capacity of the 140-mile segment to Martin County would be 250 MMcfd.

Besides the Sunshine system, two other systems are competing to be the major transporter of new supplies from Mobile Bay.

Transcontinental Gas Pipeline Co. (TGPL) last year completed construction of the first Mobile Bay pipeline hookup.

Citrus Corp., which owns Florida Gas, asked FERC to approve a transport-only pipeline that would be in direct competition with the TGPL line.

The Citrus line would run from Bayou La Batre, Ala., 50 miles north to a linkup with its Florida Gas system near Citronelle, Ala. The $32.4 million, 30-in. line would transport 550 MMcfd without compression. The addition of compression would boost capacity to more than 900 MMcfd.

Meanwhile, Enron Gas Gathering Inc., Oklahoma Gas Pipeline Co., Odeco Gas Gathering Inc., Tabasco Gas Pipe Line Co., Sonat Gas Gathering Inc., and Murphy Gas Gathering Inc. formed a venture to lay and operate a Mobile Bay region gas-gathering system.

First phase of the offshore system includes a 33 mile, 24-in. gathering trunk line and a 48-mile lateral system of varying diameter. The first phase is expected to cost $60-65 million. Capacity would be more than 300 MMcfd.

The system would connect to the proposed Citrus system. Citrus is jointly owned by Enron Corp. and Sonat Inc.

Non-Communist pipeline construction in 1988*

	4-10 in.	12-20 in.	22-30 in.	Larger than 30 in.	Total
			Miles		
GAS PIPELINES					
U.S.	704	487	884	679	2,754
Canada	609	91	—	8	708
Latin America	372	159	314	186	1,031
Asia-Pacific	278	46	302	—	626
West Europe	71	312	181	329	893
Middle East	3	6	—	—	9
Africa	8	—	—	236	244
Total gas	**2,045**	**1,101**	**1,681**	**1,438**	**6,265**
CRUDE PIPELINES					
U.S.	311	243	26	—	580
Canada	66	55	—	—	121
Latin America	73	—	—	165	238
Asia-Pacific	10	47	—	—	57
West Europe	9	5	—	6	20
Middle East	—	43	143	602	788
Africa	201	48	50	—	299
Total crude	**670**	**441**	**219**	**773**	**2,103**
PRODUCT PIPELINES					
U.S.	441	112	—	—	553
Canada	—	—	—	—	—
Latin America	360	—	—	—	360
Asia-Pacific	—	—	—	—	—
West Europe	16	—	—	—	16
Middle East	—	—	—	—	—
Africa	3	—	—	—	3
Total product	**820**	**112**	**—**	**—**	**932**
NON—COMMUNIST WORLD TOTALS					
Gas	2,045	1,101	1,681	1,438	6,265
Crude	670	441	219	773	2,103
Product	820	112	—	—	932
Total	**3,535**	**1,654**	**1,900**	**2,211**	**9,300**

*Projects planned and under way, at start of 1988 and scheduled for completion in 1988.

California EOR demand

For almost 3 years, the FERC has had before it proposals from Kern River Transmission Co. and Mojave Pipeline Co. to supply gas to California's thermal enhanced oil-recovery (TEOR) market.

Meanwhile, additional proposals are pending. Wyoming-California Pipeline Co. (Wycal), a Coastal Corp. subsidiary, last year joined the list asking FERC approval of the line.

Wycal proposes to build a $665-million, 1,000-mile, 16—36-in. pipeline from the Rocky Mountain Overthrust Belt in southwestern Wyoming to near Bakersfield, Calif. The pipeline would carry about 400 MMcfd of gas from western Wyoming and 250 MMcfd from other pipelines.

Inland Development Co., Calgary, proposes a 1,000-mile pipeline to move as much as 1.2 bcfd of Alberta gas to southern California.

The project, initially called Southcoast Transmission Corp., is still under review by Inland.

Inland has not sought FERC approval of the line.

New U.S. lines

Other new gas lines are designed to tie into new production in the Gulf of Mexico besides those for Mobile Bay.

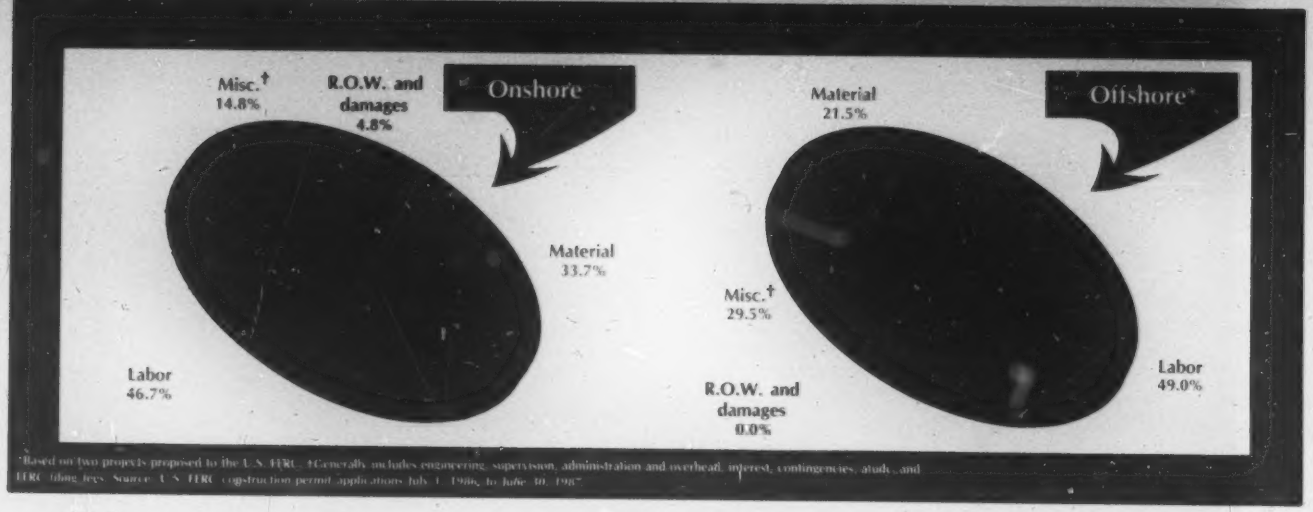
Seagull Energy Corp.'s Seagull Shoreline System was expanded last year to a capacity of 415 MMcfd from 200 MMcfd with construction of 15.8 miles of 20-in. onshore line. The system moves gas to the middle Texas coast from the Matagorda Bay area of the gulf.

Seagull and Amoco Gas Co. formed an equally owned joint venture called Cavallo Pipeline Co. to build a 60 mile, 150—220-MMcfd pipeline to transport more Matagorda Island area offshore gas to shore.

The line would consist of a 16-in. and 20-in. offshore segment to tie into an existing 16-in. Seagull line near Matagorda Island and terminate onshore in a 24-in. line to Amoco Production Co.'s Sweeny, Tex., gas plant.

Transco Gas Gathering Co. and Commet Resources Inc. formed a partnership to lay and operated a 20 -in., 31-mile intrastate system off Texas. The $20 million, 300-Mmcfd Tomcat system will connect production from Matagorda

Gas-pipeline construction costs 1



*Based on two projects proposed to the U.S. FERC. †Generally includes engineering, supervision, administration and overhead, interest, contingencies, studies, and FERC filing fees. Source: U.S. FERC construction permit applications July 1, 1986, to June 30, 1987.

U.S. interstate systems reflect restructuring

PETROLEUM AND NATURAL-GAS PIPELINES IN THE U.S. continued to see reduced revenues and income from operations in 1986 despite a generally brightening demand picture.

This trend is evident from reports filed by the regulated interstate pipeline companies with the U.S. Federal Energy Regulatory Commission (FERC) for 1986, the most recent year for which data are available.

Furthermore, 1986 pipeline mileage of the 142 liquids-pipeline and 134 gas-pipeline companies reflected flat growth in the U.S. system.

Revenues, income drop

Operating revenues of liquids-pipeline companies at $7.3 billion in 1986 were down almost $173.8 million (-2.3%) from 1985. The same companies' net income for 1986 exceeded $2 billion, a drop of $379.5 million (-15.6%) from the previous year.

Regulated interstate natural-gas companies in 1986 faced increased producer and end-user cooperation combined with more pipelines opening their systems for contract carriage.

The result of this was a sizable drop in their operating revenues.

For all natural-gas companies, revenues fell more than $15 billion (-27.7%) to $40.7 billion; for the 44 majors, revenues were off $14.1 billion (-29.7%) to $33.5 billion. Net incomes for natural-gas companies also fell in 1986. For all gas pipelines, net incomes dropped almost $538 million (-24.5%) to $1.6 billion; for majors, incomes fell more than $446 million (-24.9%) to $1.4 billion.

FERC distinctions between "major" and "nonmajor" natural-gas pipeline companies are explained later.

Total U.S. interstate mileage for 1986 as reported to the FERC (Table 1) by all 276 reporting companies was 449,884 miles, down 912 miles (-0.2%) from 1985.

Total liquids lines (which include crude oil, crude-oil products, and natural-gas liquids) experienced a slight drop of 1,387 miles (-0.8%) to 170,014 miles for 1986, showing up mostly in crude-oil gathering and trunk lines, while product lines increased slightly.

Total natural-gas pipeline utilization increased 475 miles (0.17%) for all companies filing mileage data. For the 44 major gas-pipeline companies, the advance was only 1,231 miles or 0.49% over mileage for 1985.

Construction pace

Proposed construction activity for the natural-gas pipeline industry nevertheless showed signs of health, at least as indicated by the number of projects proposed to the FERC between July 1, 1986, and June 30, 1987. During that period, 106 land and offshore projects were proposed for gas-pipeline construction, compared with 93 for the previous 13-month period. Proposed mileage for these projects, however, showed a 47.1% drop over the mileage for the projects proposed in the 1985-86 period: 1,304.51 miles compared with 2,466.82. Oil & Gas Journal's Worldwide Construction Report (OGJ, Oct. 26, 1987) listed 61 individual pipeline projects totaling more than 13,560 miles of U.S. pipeline construction either proposed, planned, or under way. By comparison, the Journal's Oct. 26, 1986, construction report listed 95 U.S. pipeline projects proposed, planned, or under way, totaling more than 10,800 miles.

In a year's time, the total number of projects reported by the Journal has dropped (-35.8%), while the mileage has increased (25.6%).

Natural-gas pipeline projects reported in the construction report add to 51 involving more than 8,300 miles of pipeline. The report a year earlier listed 74 gas-pipeline projects totaling 6,900 miles.

Prospects for some of these lines being built, although better than in 1986, are still somewhat doubtful. Many are competing for the same markets or may

Table 1

U.S. interstate pipeline mileage

Year	Miles		
	Gas	Liquid	Total
1975	255,792	172,680	428,472
1976	254,548	174,072	428,590
1977	256,198	170,948	427,146
1978	258,576	162,452	421,028
1979	264,134	169,794	433,928
1980	274,248	172,673	446,921
1981	274,634	172,815	447,449
1982	286,999	172,549	459,548
1983	285,204	167,819	453,023
1984	*258,379	173,922	*432,301
1985	*279,395	171,401	*450,796
1986	*279,870	170,014	*449,884

Source: U.S. FERC Form 6 Annual Reports—oil pipelines; Forms 2 & 2A—gas pipelines.
*Reflects operating mileage as reported under the FERC's classification system for natural-gas pipeline companies effective beginning with the 1984 reporting year. Only major gas-pipeline companies are required to file mileage.

Table 2

Investment in liquids pipelines

	Company and investment, $						
	A	B	C	D	E	Total, $	%
CRUDE PIPELINES INVESTMENT BY FIVE COMPANIES							
Land	1,759,081	814,497	293,698	966,772	1,124,012	4,958,060	0.30
Right of way	12,139,025	1,004,094	316,392	16,240,041	14,878,273	44,577,825	2.74
Line pipe	134,882,087	25,663,608	11,262,597	95,175,023	151,224,489	418,207,804	25.67
Line pipe fittings	9,067,392	907,765	1,754,290	17,109,157	26,402,094	55,240,698	3.39
Pipeline construction	188,909,303	27,482,679	16,160,573	216,674,537	213,377,895	662,604,987	40.67
Buildings	19,211,690	4,827,378	2,453,994	13,507,861	9,530,272	49,531,195	3.04
Boilers	—	—	—	—	—	—	—
Pumping equipment	23,110,667	5,524,747	2,414,882	16,872,369	49,028,541	96,951,206	5.95
Machine tools and machinery	—	—	—	33,140	—	33,140	—
Other station equipment	33,418,715	18,356,368	4,539,253	44,452,993	26,780,166	177,547,495	10.90
Oil tanks	14,494,825	5,979,056	5,678,530	16,259,493	25,845,284	68,257,188	4.19
Delivery facilities	—	—	5,275,462	2,290,758	6,878,472	14,444,692	0.89
Communications systems	541,235	3,170,070	68,631	10,154,566	3,193,250	17,127,752	1.05
Office furniture and equipment	1,039,700	204,653	203,519	1,301,508	1,413,129	4,162,509	0.26
Vehicles and other work equip.	6,966,326	1,909,806	522,693	5,704,674	232,065	15,335,564	0.94
Other property	—	—	—	—	49,795	49,795	0.01
Total	**$495,540,046**	**$95,844,721**	**$50,944,514**	**$456,742,892**	**$529,957,737**	**$1,629,029,910**	**100.00**
PRODUCT PIPELINES INVESTMENT BY FIVE COMPANIES							
Land	4,258,254	1,763,961	532,035	936,546	3,105,273	10,596,069	0.37
Right of way	28,011,020	10,825,804	18,427,609	8,612,026	6,888,616	72,765,075	2.56
Line pipe	339,947,575	67,586,031	107,107,622	86,230,220	98,735,664	699,607,112	24.63
Line pipe fittings	71,872,261	12,811,359	15,062,869	1,628,102	20,305,651	121,680,242	4.28
Pipeline construction	562,242,538	109,136,840	199,561,098	97,827,608	137,305,650	1,106,073,734	38.94
Buildings	23,494,550	3,982,143	4,616,505	10,420,534	17,268,711	59,782,443	2.10
Boilers	—	—	—	—	—	—	—
Pumping equipment	45,742,948	5,857,252	30,739,859	28,200,293	23,536,641	134,076,993	4.72
Machine tools and machinery	—	—	—	—	353,373	353,373	0.01
Other station equipment	117,765,625	20,974,208	37,342,124	23,108,744	96,714,654	295,905,355	10.42
Oil tanks	47,958,797	16,961,752	8,752,431	17,444,483	45,525,335	136,642,798	4.81
Delivery facilities	—	—	9,616,375	10,843,868	44,948,280	65,408,523	2.30
Communication systems	1,117,397	316,183	2,130,593	8,692,502	—	12,256,675	0.43
Office furniture and equipment	9,842,391	2,117,270	2,293,689	584,119	652,162	15,489,631	0.55
Vehicles and other work equip.	5,338,085	1,734,659	7,417,134	2,100,323	1,818,381	18,408,582	0.65
Other property	72,893,538	—	18,629,920	—	—	91,523,458	3.22
Total	**$1,330,484,979**	**$254,067,462**	**$462,229,863**	**$296,629,368**	**$497,158,391**	**$2,840,570,063**	***100.0**

Source: U.S. FERC Form 6, Annual Report of Oil Pipeline Companies, Dec. 31, 1986.

* Actual total does not equal 100 due to independent rounding.

become uneconomical in the current petroleum markets.

This seems especially true for pipelines competing to supply natural gas to the enhanced oil-recovery projects in California as well as many projects for the U.S. Northeast.

Projects to bring Canadian natural gas into the U.S., primarily to the Mid-Atlantic and Northeast states, had so proliferated throughout 1986 and into 1987 that the FERC in August 1987 dismissed without prejudice more than 70 of the estimated 126 applications that had been filed.

This was an effort to wring some order from the mass of proposals.

The Commission declared an "open season" through Jan. 15 on refiling U.S. Northeast gas-expansion projects. And it encouraged sponsors of the dismissed applications to update, amend if desired, and refile applications, complying with the latest agency regulations.

At the deadline, more than 40 applications from more than 20 pipelines had been filed.

Crude-oil projects in the Oct. 26, 1987, Oil & Gas Journal Worldwide Construction Report totaled 4 comprising more than 1,809 miles.

The construction report a year earlier listed 9 crude-oil pipeline projects totaling 3,100 miles.

Finally, the Journal report has listed 6 product-pipeline projects with more than 590 miles of pipeline.

In 1986, 12 product-pipeline projects totaling 740 miles were reported.

U.S. interstate network

For any year, U.S. petroleum and natural-gas pipeline mileages are not directly comparable for two reasons.

- The fluctuating number of companies required to file reports with FERC varies each year.
- Secondly, the FERC's system for classifying interstate natural-gas pipeline companies.

Beginning with the 1984 reporting year, companies have been classified as "major" or "nonmajor" based on total natural-gas transmissions for each of the 3 previous reporting years. (See FERC Accounting and Reporting Requirements for Natural Gas Companies, paragraph 20-011.)

One effect of this change has been that companies subsequently classified as "nonmajor" are exempt from filing certain data. Chief among these excluded figures are mileage and gas-sales figures, although many companies nonetheless file them voluntarily.

These figures should be excluded from a determination of total U.S. interstate pipeline utilization for any given year because of their unreliability from year to year.

Therefore, combining 1986 mileage data for all regulated liquids-pipeline companies (170,014) with mileage reported by the "major" natural-gas pipeline companies (253,641) yields a total figure of 423,655. This represents a 0.04% decrease 156 miles from comparable figures reported for 1985 (171,401 + 252,410 = 423,811).

Completed compressor-station costs—1984*

Table 3

Location†	Number of units	Total horsepower	Cost, $ Equipment & material	Labor	Engineering & supv.	Misc.§	Total cost	$/hp
ONSHORE								
New reciprocating-unit stations								
Texas (F)	1	108	109,011	36,471	—	36,930	182,412	1,689
Oklahoma (F)	1	200	68,137	41,620	—	71,179	180,936	905
Texas (F)	1	500	274,297	160,537	—	66,379	501,213	1,002
Oklahoma (F)	1	520	188,275	136,890	—	31,818	356,983	687
Oklahoma (F)	1	521	706,407	177,730	262,083	176,151	1,322,371	2,538
Arkansas (F)	1	950	108,573	100,659	—	25,960	235,192	248
Alabama (F)	2	1,268	897,107	380,969	—	60,900	1,338,976	1,056
Texas (F)	3	1,800	1,224,952	596,324	—	109,256	1,930,532	1,073
Oklahoma (T)	3	3,300	2,495,575	502,415	890,808	1,614,992	5,503,790	1,668
W. Virginia (T)	3	3,300	4,614,600	2,187,400	—	1,009,200	7,811,200	2,367
Reciprocating-unit additions								
Louisiana (F)	1	46	20,784	14,327	—	6,980	42,091	915
Oklahoma (F)	1	450	521,749	227,508	—	37,827	787,084	1,749
Texas (F)	1	450	403,080	136,655	—	227,008	766,743	1,704
New Mexico (F)	1	1,100	330,183	193,772	—	93,411	617,366	561
New Mexico (F)	1	1,100	405,159	179,546	—	209,699	794,404	722
Kansas (F)	2	1,715	1,054,475	259,817	—	361,327	1,675,619	977
Oklahoma (F)	2	4,000	2,351,940	570,575	284,089	177,087	3,383,691	846
Turbine-driven centrifugal additions								
New York (T)	2	11,600	4,745,793	734,667	289,465	191,875	5,961,800	514
Total onshore	**28**	**32,478**	**$20,520,097**	**$6,637,882**	**$1,726,445**	**$4,507,979**	**$33,392,403**	**$1,028**
OFFSHORE								
New reciprocating-units stations								
Louisiana	1	1,100	342,446	357,554	—	21,840	721,840	656
Total offshore	**1**	**1,100**	**$342,446**	**$357,554**	**—**	**$21,840**	**$721,840**	**$656**
Total compressor-station completions—1984	29	33,578	$20,862,543	$6,995,436	$1,726,445	$4,529,819	$34,114,243	$1,106

Source: U.S. FERC Staff Report, "Cost of Pipeline and Compressor Station under Natural Gas Act Section 7(c) for the Years 1981 through 1984."
* Reflects costs for projects completed in 1984, the most recent year for which data are available. † T = transmission station; F = field station; S = storage station. § Generally includes interest during construction, overheads, land, ROW, damages, contingencies, and other costs.

This compares with a similarly small change for 1985 over 1984, a drop of 2,917 miles (-0.68%) for all liquids-pipeline and major gas-pipeline companies.

At the end of 1986, reports from liquids-pipeline companies showed a total of 34,209 miles of gathering lines, 54,153 miles of crude-oil trunk lines, and 81,652 miles of products pipelines.

For liquids-pipeline companies, the factor which dictates whether a company must file an annual report (Form 6) is whether the FERC determines the company to be an interstate common-carrier pipeline.

These reports for 1986 show that gathering lines decreased by 812 miles (-12.3%) and crude-oil lines, by 1,691 miles (-3.03%) over totals reported for 1985. Products lines increased by 1,116 miles (1.4%).

The drop in crude-oil trunk and gathering lines (-2,503 miles; -2.75%) reflects continued declines in U.S. field development and crude-oil production. The overall decline is in line with the erratic pattern of liquids-pipeline utilization for the past 6 years (Table 1).

The pattern of falling U.S. crude-oil transportation and rising U.S. product movement by pipeline is likely to continue for several years as less domestic crude oil moves through gathering and trunk systems to U.S. refineries and more foreign crude is imported directly, in most instances, to those same refineries.

Natural-gas transmission lines were up 475 miles (0.17%) for all companies; 1,231 miles (0.49%), for majors. Storage lines increased 751 miles (16.6%%) for all filing gas companies; 726 miles (16.8%), for majors.

Field-line utilization fell 4,211 miles (-5.5%) for all companies; 3,439 miles (-5.1%), for majors.

Deliveries up; sales down

Throughput for liquids-pipeline companies in 1986 showed moderate but consistent gains over 1985. Natural-gas pipelines, on the other hand, were showing the effects of the structural changes in their industry.

Crude-oil and product deliveries last year exceeded 11 billion bbl, an increase over 1985 of 337.7 million bbl (3.14%).

The largest gain was in product deliveries, up 209,8[illegible] million bbl (4.7%) over 1985. Crude-oil deliveries rose only fractionally, 47,762 million bbl (0.8%).

The healthy gain in product deliveries reflects increased demand across the spectrum of products in 1986.

Trunkline traffic for U.S. crude-oil and product pipelines also showed modest but real gains in 1986.

Traffic totaled 1,893 billion bbl-miles of crude oil, an increase of 51 billion bbl-miles (2.8%) over 1,842 billion bbl-miles for 1985.

Product traffic totaled 1,573 billion bbl-miles, compared with 1,500 billion bbl-miles in 1985, an increase of 73 million

bbl-miles (4.86%).

Total trunkline traffic for crude-oil and product pipelines in 1986 reached 3,466 billion bbl-miles, an increase of 124.7 billion bbl-miles (3.73%) over 3,341.8 billion bbl-miles for 1985.

The real story, however, lies in natural-gas transmissions.

In 3 years of reporting, gas sales by majors have fallen 4,648.6 bcf (36.2%) from 12,846.1 bcf in 1984.

Among all filing companies for 1986, gas transmissions were slightly less than 9.5 tcf, down almost 3.1 tcf (-24.5%) from 12.5 tcf in 1985. Among majors, transmissions fell to just short of 8.2 tcf, down more than 2.8 tcf (-25.8%) from 11 tcf in 1985.

But the most precipitous fall occurred in 1986 and is a direct result of industry structural changes begun in late 1985.

First issued in October 1985, FERC Order 436 was an effort by the Commission to make the natural-gas transmission industry more competitive.

It proposed allowing companies which had formerly bought then resold natural gas on long-term contracts with producers and end users to open part of their systems for transporting someone else's gas for a fee. In effect, the transmission company would become a middle man between the gas producer and the gas end user.

Although most companies initially resisted the move primarily because it failed to address the industry's burgeoning take-or-pay problems in a glutted gas market, 1986 saw a large number of companies finally agreeing to become "open-access" pipelines as proposed in the order.

And in August of last year, the Commission issued Order 500 to complement 436 by proposing a mechanism which addresses the problem of pipelines' take-or-pay liabilities.

In 1986, 40 natural-gas transmission companies either applied for, received, or were otherwise involved in open-access-status decisions by the commission. Of these, 16 were majors.

The drastic reduction in natural-gas throughput in 1986 along with the slash in company operating revenues and incomes discussed earlier are a direct result of more producer end-user cooperation and subsequent circumvention of the conventional pipeline contractual arrangements used to serve given markets.

Further aggravating gas pipelines' reduced throughput problems in 1987 as a result of the effects of 436 have been the warmer-than-normal winters. Winter weather in 1988, however, has brought some relief in terms of increased natural-gas demand as weather patterns have returned somewhat to their colder norms.

Most interstate gas pipelines reported to the FERC increased gas volumes and revenues from transport of gas for others in 1986.

But all said that profits from such transactions are considerably slimmer than under the traditional buy-resell long-term-contract procedures.

For all natural-gas pipeline companies, net income as a portion of gas-plant investment dropped to 3.4% in 1986 from 4.5% for 1985 and 8.7% for 1984.

Major companies' net income as a portion of gas-plant investment in 1986 fell to 3.2% from 4.3% for 1985 and 7.6% for 1984.

Companies' gas-plant investment ran counter to trends for operating revenues and net incomes for all pipelines as well as for major ones.

For 1986, all gas companies reported an industry gas-plant investment totaling more than $49.4 billion for 1986 compared with $48.3 billion for 1985 and $47.3 billion for 1984.

Majors' gas-plant investment in 1986 reached $42.2 billion compared with $41.9 billion in 1985 and $37.8 billion for 1984.

This represented an increase for all companies in 1986 of $1.1 billion (2.3%) compared with 1985. For majors, the increase was less than 1%.

For interstate common-carrier crude-oil and products pipeline companies, net income as a percentage of investment in carrier property was 9.2% in 1986 compared with 11.3% in 1985 and 13.1% in 1984.

The liquids-pipeline companies increased investment in carrier property for 1986 by $778.5 million (3.6%) to $22.4 billion compared with $21.6 billion for 1985 and $19.4 billion for 1984.

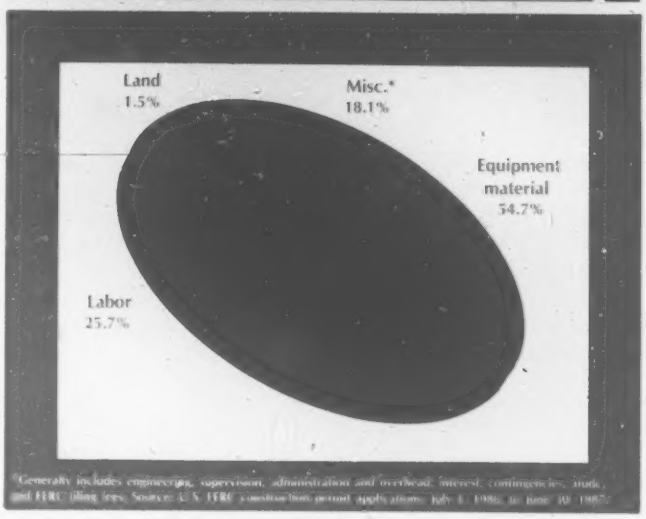
Table 2 indicates that investment by five regularly tracked crude-oil pipelines stood at $1,629 million at the end of 1986 compared with $1,568 million at the end of 1985, an increase of more than $61 million (3.89%).

Investment by five products pipeline companies was $2,840 million at the end of 1986 compared with $2,847 million at the end of 1985, a fractional decrease of $6.2 million (-0.2%).

For crude-oil and products pipeline companies, the major investment was in pipeline construction: 40.67% for the crude-oil pipelines and 38.94% for the products pipelines.

Line pipe and fittings accounted for slightly less than 30% for both crude-oil and products pipeline investment, while pump stations and equipment accounted for 19.89% of the investment in crude-oil pipelines and 17.25% for products pipelines.

Onshore compressor-station costs 2



*Generally includes engineering, supervision, administration and overhead, interest, contingencies, tools, and FERC filing fees. Source: U.S. FERC construction permit applications, July 1, 1986, to June 30, 1987.

Construction activity

The costs of line pipe and fittings and of laying pipelines make up roughly 70% of the cost of a pipeline system. These elements of pipeline construction costs have shown minor escalation for the past few years, after rapidly increasing before 1982.

There were 104 land-pipeline construction projects and 2 offshore for a total of 106, a 14% increase over 93 projects (86 land, 7 offshore) reported a year earlier. Projects reported on in 1986 had shown a 50% jump over projects reported the year before.

The onshore projects represented 1,300.31 miles of pipeline at an estimated price tag of more than $919.6 million, and the offshore pipeline projects represented 4.2 miles of offshore pipeline with an estimated price tag of slightly less than $3.5 million.

Total estimated costs for these projects, land and offshore, reached slightly more than $923 million.

Total costs of projects reported in 1986 ran $1,811 million

Table 4

Natural-gas pipeline transmission expenses*

	Expenses, $		Cost/mile, $		Cost/MMcf sold, $	
	1984-majors†	1985-majors§	1984-majors†	1985-majors§	1984 majors†	1985-majors§
Operation expenses						
Supervision and engineering	131,521,396	141,111,223	519.60	534.15	9.90	12.46
System control and load dispatching	25,744,727	28,003,796	101.70	106.00	1.96	2.47
Communication system expenses	22,680,380	25,198,795	89.60	95.39	1.72	2.22
Compressor station labor and expenses	241,754,444	241,167,595	995.00	912.90	18.38	21.29
Gas for compressor station fuel	938,899,424	748,735,039	3,709.10	2,834.21	71.38	66.09
Other fuel and power for compressor stations	61,143,396	62,883,011	241.50	238.03	4.65	5.55
Mains	193,277,540	194,353,906	763.50	735.69	14.69	17.16
Measuring and regulating station expenses	68,129,612	70,192,395	269.10	265.70	5.18	6.20
Transmission and compression of gas by others	1,668,917,320	1,472,161,326	6,590.00	5,572.61	126.88	129.95
Other transmission expenses	49,048,231	47,009,813	193.80	177.95	3.73	4.15
Rents	19,188,281	17,089,546	75.80	64.69	1.46	1.51
Total operation expenses	**3,420,304,751**	**3,047,906,445**	**13,511.80**	**11,537.32**	**260.03**	**269.05**
Maintenance expenses						
Supervision and engineering	33,302,063	38,445,814	131.60	145.57	2.53	3.39
Structures and improvements	25,785,236	26,126,983	101.90	98.90	1.96	2.31
Mains	83,272,664	90,064,519	329.00	340.92	6.33	7.95
Compressor station equipment	165,100,644	174,091,277	652.20	658.99	12.55	15.37
Measuring and regulating station equipment	14,480,791	13,635,384	57.20	51.61	1.10	1.20
Communication equipment	13,376,965	13,164,377	52.80	49.83	1.02	1.16
Other equipment	4,615,509	4,216,143	18.20	15.96	0.35	0.37
Total maintenance expenses	**339,933,872**	**359,754,497**	**342.90**	**1,361.78**	**25.80**	**31.76**
Total transmission expenses	**$3,760,238,623**	**$3,407,660,942**	**$14,854.70**	**$12,899.10**	**$285.83**	**$300.80**
Total miles of transmission pipeline	**253,135**	**264,178**				
Total natural gas sold, MMcf	**13,153,705**	**11,328,495**				

Source: Statistics of Interstate Natural Gas Pipeline Companies—1984 & 1985. U.S. Department of Energy. * U.S. interstate pipelines for calendar years 1984 & 1985. † 43 of 142 companies filing Form 2's for 1984 with the U.S. Federal Energy Regulatory Commission; defined as those interstate natural-gas pipeline companies that had combined gas sales for resale and gas transported (interstate) or stored for a fee that exceeded 50 bcf during 1984. §45 of 137 companies filing Form 2's or 2A's with the FERC for 1985.

divided between $1,713 million for land and $97.9 million for offshore.

Although the actual number of projects was up, the number of miles proposed fell by 1,162.31 miles (47.1%) over what was proposed for the 13-month period of June 1, 1985, to July 1, 1986.

Between the two periods, proposed land miles decreased 1,070.55 miles (-45.2%); offshore, by 91.76 miles (-95.6%). These figures point out the focus of the U.S. pipeline industry in 1986 as it sought to increase capacity to serve Northeast markets.

Of the land projects proposed, 57 are for the U.S. Northeast (W. Virginia to New Hampshire).

Cost trends

Cost-per-mile figures may reveal more about cost trends than aggregate costs.

For proposed U.S. gas-pipeline projects in the 1986—87 period surveyed, the average onshore cost per mile was $707,253, compared with $722,850/mile for the 1985—86 period, a decrease of 2.2%.

For offshore projects, the 1986—87 figure was $825,395/mile compared with $1,020,095/mile for 1985—86.

But the paucity of offshore projects makes unreliable any conclusions about yearly shifts in cost-per-mile averages.

Combined onshore and offshore projects showed an average cost of $707,634/miles for 1987 coverage; for the 1985—86 period, the figure was $734,413/mile.

Analyses of the four major categories of pipeline construction costs--material, labor, right-of-way and damages, and miscellaneous--can also indicate trends within each group.

Miscellaneous generally includes engineering, supervision, contingencies, allowances for funds used during construction (afudc), administration and overheads, and FERC filing fees.

For the 106 projects surveyed for the 1986—87 period, cost-per-mile data for the four categories are as follows:

- Material—land, $237,513/mile; offshore, $177,381/mile; total, $237,320/mile.
- Labor—land, $329,331/mile; offshore, $404,762/mile; total, $329,573/mile.
- R.O.W. and damages—land, $33,720/mile; total, $33,720/mile.
- Miscellaneous—land, $104,802/mile; offshore, $243,252; total, $105,248/mile.

The average cost per mile for the projects shows no clear-cut trend related to either length or geographic area.

In general, however, the cost per mile within a given diameter indicates that the longer the pipeline, the lower the cost per mile for construction.

Nonetheless, road, highway, and river crossings and marshy or rocky terrain each strongly affects pipeline construction cost.

Fig. 1 shows the major cost-component split for pipeline construction cost.

For onshore pipelines, material—including line pipe, fittings, valves, coating, etc.—represents an average of 33.7%

of the construction cost; labor, 46.7%.

For offshore pipelines, material represents 21.5% of the construction cost; labor, 49.0%.

Thus, labor and material comprise 80.4% of the cost of constructing onshore pipelines and 70.5% of the cost for offshore pipelines.

Similarly, construction cost trends for offshore projects published previously have shown a generally rising cost per mile with increasing diameter. Cost-trend implications from projects for the 1986—87 period must be discounted because there were only two.

Compressor-station costs make up another major cost element of natural-gas pipelines.

Costs for new onshore compressor stations ranged from a low of $277/hp for a 12,000-hp station in Kentucky to a high of $3,557/hp for a 2,000-hp station in Massachusetts. Cost-per-horsepower figures showed no particular correlation with compressor-station size or location.

Fig. 2 shows the cost split for onshore compressor stations.

The cost of equipment and materials represents 54.7% of the cost of a compressor station, while installation labor amounts to about 25.7%.

Completed projects

One factor in compressor-station costs is the type of driver specified. Table 3 is a compilation from the most recent FERC staff report on costs of compressor stations completed in 1984.

It is broken down by the type of prime mover. Of the 21 compressor stations completed in 1984 and their costs reported to the FERC, 10 of the new stations were onshore reciprocating-unit stations. And 2 new reciprocating stations offshore were completed.

For the period, no new turbine-driven centrifugal units onshore were reported.

Of compressor-station additions onshore, 7 were reciprocating units; 1 turbine-driven centrifugal addition was reported.

Fig. 3, taken from FERC staff reports for 1979-1982 & 1981-84, shows the natural-gas pipeline mileage and compressor-station horsepower installed for 1977 through 1984.

It gives total pipeline mileage installed onshore and offshore, along with the total expenditures for the 8-year period.

Also plotted is pipeline mileage completed in each year from 1977 through 1984, both onshore and offshore.

As the curves show, offshore construction milaege dropped after 1978, remained essentially flat through 1982, dropped off again in 1983, and was flat through 1984.

Onshore construction on the other hand escalated steeply through 1982 then dropped precipitously for 1983, slowing slightly for 1984. During the 8-year period, 10,933.54 miles of pipeline construction were completed of which 8,582.86 miles were constructed onshore, and 2,350.68 miles were constructed offshore.

Total compression horsepower installed during the period was 1,090,911 hp. Expenditures totaled almost $6.7 billion for pipeline and compressor-station construction.

Transmission expenses

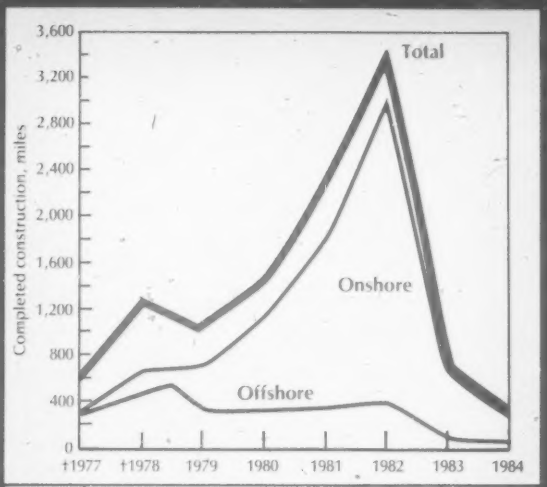
Once a natural-gas pipeline is laid and compressor stations constructed, operating costs become the next consideration. As an aid in estimating this element, Table 4, transmission expenses for interstate gas pipelines for 1984 and 1985, has been included. Its data are based on 253,135 miles of pipeline and 13,153,705 MMcf sold for 1984 majors and on 264,178 miles of pipeline and 11,328,495 MMcf of gas sold for 1985 majors.

- The highest component of transmission operating expenses is transmission and compression of gas by others: for majors in 1984, this component was $6,590/mile or $126.88/MMcf of gas sold; for majors in 1985, this component was $5,573/mile or $129.95/MMcf.
- The second highest cost component of transmission operating expense is gas for compressor-station fuel: for majors in 1984, $3,709.10/mile or $71.38/MMcf of gas sold; for majors in 1985, $2,834.21/mile or $66.09/MMcf.
- The highest cost component of maintenance expense covers compressor-station equipment: for 1984 majors, $652.20/mile or $12.55/MMcf sold; for major in 1985, $658.99/mile or $15.37/MMcf.
- The second highest cost component for maintenance is the maintenance of pipelines: for 1984 majors, $329/mile or $6.33/MMcf sold; for majors in 1985, $340.92/mile or $7.95/MMcf.
- As Table 4 shows the highest component of transmission expense is operating expense: for 1984 majors, $13,511.80/mile or $260.03/MMcf of gas sold; for 1985 majors, $11,537.32/mile or $269.05/MMcf.
- Unit maintenance expenses for 1984 majors was $1,342.90/mile or $25.80/MMcf of gas sold; for 1985 majors, $1,361.78/mile or $31.76/MMcf.
- During 1984, major natural-gas pipeline companies spent more than $3,420 million for operation of natural-gas transmission pipelines and slightly less than $340 million for maintenance, for a total of more than $3,760 million for transmission of natural gas.

Majors for 1985 spent almost $3,048 million for operation expenses and nearly $360 million on maintenance. Total expenditures by 1985 majors for operation and maintenance expenses reached $3,407.7 million.

- On a unit basis, the total 1984 transmission expense for majors was $14,854.70/mile or $285.83/MMcf; for 1985 majors, $12,899.10/miles or $300.80/MMcf of gas sold.

U.S. gas-pipeline construction 3



Year construction ended	Miles			Total hp	Total $
	Total	Onshore	Offshore		
†1977	562.19	283.07	279.12	79,590	250,442,550
†1978	1,270.60	698.34	572.28	204,492	918,079,934
1979	1,023.62	711.98	311.03	78,100	437,964,247
1980	1,430.79	1,113.09	317.70	159,088	695,865,650
1981	$2,124.40	$1,784.82	339.58	$254,400	$1,132,228,854
1982	$3,428.76	$3,042.18	386.58	$245,400	$2,694,804
1983	$728.72	$661.29	67.43	$48,980	$314,493,944
1984	365.05	288.09	79.96	22,721	219,056,519
Total	10,933.54	8,582.56	2,350.68	1,091,911	$6,662,272,502

*Mileage completed in each year for all diameter classifications. †Excludes data for pipeline projects of less than 1 mile. Source: FERC Staff Reports. Source: FERC Staff Reports, 1979-1982 & 1981-1984

Single point mooring around the world

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number- Size/System	Water Depth (Ft.)
Angola	1968	Cabinda	Gulf	SBM	100,000	2-16"/CALM	77
	1979	Quinfuquena	Petrangol	EMH	150,000	2-16"	NA
	1980	Essungo	Texaco/Petrangol	IMODCO	250,000	2-24" & 1-16"/CALM	115
	1980	Cabinda	Gulf	SBM	55,000	1-4"/CALM	118
	1982	Takula	Gulf	SBM	300,000	1-12"/CALM	200
	1984	Palanca	Elf	SBM	250,000	S-Y CALM	148
	1985	Takula II	Gulf	SBM	319,000	CALM	72
Argentina	1970	Puerto Rosales	YPF	IMODCO	40,000	1-16" & 1-12"/CALM	59
	1975	Caleta Olivia	YPF	IMODCO	60,000	1-20" & 1-12"/CALM	113
	1979	Caleta Cordova	YPF	IMODCO	60,000	1-20" & 1-12"/CALM	89
	1980	Puerto Rosales	YPF	IMODCO	60,000	1-20" & 1-12"/CALM	NA
	1987	Hidra	Total	SBM	N/A	CALM	N/A
Australia	1970	Botany Bay	Maritime Services	SBM	120,000	3-12"/CALM	63
	1985	Jabiru	BHP	SBM	160,000	Turret/FPS	394
Bangladesh	1967	Chittagong	Chittagong Port Trust	IMODCO	45,000	1-12"/CALM	45
Brazil	1968	Tramandai	Petrobras	SMB	105,000	2-16"/CALM	71
	1970	Tramandai	Petrobras	SBM	200,000	1-24"/CALM	71
	1975	Garoupa	Perobras	CB & 1	53,000	NA	NA
	1975	Garoupa	Petrobras	CB & 1	53,000	NA	NA
	1976	Sao Francisco	Petrobras	IMODCO	200,000	2-20"/CALM	72
	1978	Garoupa	Petrobras	IMODCO	53,000	2-16"/CALM	410
	1978	Enchova 4	Petrobras	SBM	53,000	1-8"/CALM	410
	1979	Tedut & Tefran	CEC/Petrobras	SBM	200,000	2-20"/CALM	72
	1980	Arembepe	Tibras	SBM	4,000	1-16"/CALM	60
	1981	Pampo	Petrobras	SBM	53,00	1-16"/CALM	460
	1981	RJS 28A	Petrobras	SBM	53,000	1-16"/CALM	395
	1981	Badejo	Petrobras	IMODCO	53,000	2-10"/CALM	338
	1982	Corvina	Petrobras	SBM	53,000	2-8"/CALM	492
	1982	Garoupa	Petrobras	Bluewater	100,000	S-Y CALM	
Brunei	1971	Seria	Shell	SBM	150,000	2-16"/CALM	73
	1975	Seria	Shell	SBM	210,000	2-20"/CALM	67
	1981	Seria	Shell	Mitsubishi	313,000	1-20" & 1-16"/CALM	NA
Cameroon	1976	Kole	Elf Serepca	IMODCO	150,000	1-12"/CALM	80
	1979	Kole	Elf Serepca	Bluewater	250,000	1-24"/CALM	102
	1979	Limboth Point	Sonara	SBM	150,000	2-16" & 1-16"/CALM	75
	1981	Kole	Elf Serepca	IMODCO	250,000	2-24" & 1-16"/CALM	85
	1982	Victoria Marine	Total	EMH	280,000	CALM	183
Canada	1969	St. John, N.B.	Irving Oil	SBM	350,000	1-24" & 1-16"/CALM	149
	1987	Saint John	Canaport	SBM	N/A	CALM	N/A
Chile	1971	Quintero Bay	Enap	SBM	209,000	2-20"/CALM	154
China	1985	Weitzhou	Total	EMH	250,000	Fix tower	123
	1985	Bohai Bay	JCODC	Bluewater	100,000	FPSO/TOWSY	72
	1985	Weitzhou	CSOFL	SBM	250,000	Tank Conv.	250
	1987	Bz-28-1	COPECO	SBM	N/A	Tandem Mooring System	N/A
Colombia	1985	Covenas	Occidental	Bluewater	120,000	CALM	80
	1985	Covenas	Occidental	Bluewater	350,000	CALM S-Y	110
Congo	1972	Djeno	Elf Congo	SBM	250,000	2-20"/CALM	75
Denmark	1971	Dan	Danbor	SBM	70,000	1-12"/CALM	150
	1979	Gorm	Danbor	SBM	70,000	2-12"/CALM	128
	1982	Frederickshaven	DDCS	SOFEC	35,000	2-20"/CALM	50
Dominican Republic	1971	Santo Domingo	Refineria Domincia	SBM	150,000	2-16"/CALM	85
Ecuador	1971	Esmeraldas	Gulf/Texaco	SBM	100,000	2-20"/CALM	124
	1971	Esmeraldas	Gulf/Texaco	SBM	100,000	1-24" & 1-20"/CALM	124
	1978	Esmeraldas	Texaco	IMODCO	100,000	1-24" & 1-20"/CALM	118

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
Equatorial Guinea	1963	Bata	CEPSA	IMODCO	20,000	1-16″/CALM	39
Egypt	1968	Ras-el-Shaqiq	Wepco	SBM	100,000	2-16″/CALM	78
	1974	Suez	Sumed	SBM	120,000	2-20″/CALM	82
	1974	Alexandria	Sumed	SBM	120,000	2-20″ & 1-16″/CALM	85
	1974	Alexandria	Sumed	SBM	120,000	2-20″ & 1-16″/CALM	82
	1974	Alexandria	Sumed	SBM	120,000	2-20″ & 1-16″/CALM	82
	1976	Suez	Sumed	IMODCO	250,000	2-24″/CALM	80
	1976	Alexandria	Sumed	IMODCO	250,000	2-24″ & 1-20″/CALM	108
	1976	Alexandria	Sumed	IMODCO	250,000	2-24″ & 1-20″/CALM	108
	1976	Agami	EGPA	SBM	100,000	2-16″/CALM	98
	1978	El Alamein	Wepco	SBM	100,000	2-16″/CALM	70
	1980	Ras Budran	Suez Oil Co.	SBM	250,000	1-24″ & 1-20″/CALM	115
	1981	Suez	Sumed	SBM	500,000	2-24″ & 1-16″/CALM	118
	1982	Sidi Kerir	Sumed	IMODCO	250,000	2-20″ & 1-20″/CALM	108
	1983	Zeit Bay	SUCO	SBM	155,000	2-20″/CALM	82
	1983	Ras Shukeir	EGPC	SBM	100,000	CBM	
	1983	Wadi Feiran	Petrojet	NA	100,000	NA	
	1984	East Zeit Bay	Esso	IMODCO	85,000	CALM	200
	1984	Geisum	Conoco	IMODCO	100,000	ENG FPSO	
	1985	Sadat area	Petrojet	IMODCO	60,000	CBM	60
Falklands	1984	Port Stanley	M.O.D.	IMODCO	100,000	CALM	65
France	1968	Bay of Biscay	Elf	CFEM	100,000	NA	NA
	1973	Frontignan	Mobil	IMODCO	270,000	2-20″/CALM	102
Gabon	1965	Gamba	Shell	SBM	100,000	1-16″/CALM	63
	1967	Lucina	Shell	SBM	165,000	1-16″/CALM	112
	1979	Gamba	Shell	SBM	140,000	1-16″ & 1-10″/CALM	63
	1983	Inguessi	AMOCO	Bluewater	—		
	1980	Mayumba	Elf Gabon	Bluewater	70,000	1-4″/CALM	79
Ghana	1978	Bonsu	Agripetco	SOFEC	64,000	1-10″/CALM	79
India	1975	Bombay High	ONGC	SBM	100,000	1-16″ & 1-8″/CALM	240
	1975	Bombay High	ONGC	SBM	100,000	1-16″/CALM	240
	1977	Gulf of Kutch	IOC	SBM	300,000	2-24″/CALM	115
	1982	Bombay High	ONGC	IMODCO	2,500	SBBM	262
	1983	Bombay High	ONGC	IMODCO	150,000	1-16″/CALM	NA
	1984	Gulf of Kutch	IOC	IMODCO	100,000	CALM	101
	1985	Panna	ONGC	IMODCO	115,000	CALM	120
	1987	South Bassein	ONGC	SBM	N/A	2 SVMs	N/A
Indonesia	1970	Pang Kalan Susu	Pertamina	IMODCO	100,000	2-12″/CALM	NA
	1971	Balikappan	Union Oil	SBM	250,000	2-20″ & 1-16″/CALM	102
	1971	Java Sea	ARCO	McDermott	45,000	1-8″	NA
	1971	Java Sea	IIAPCO	IMODCO	55,000	2-12″/CALM	120
	1972	Java Sea	ARCO	IMODCO	133,000	1-12″ & 2-16″/CALM	135
	1972	Java Sea	IIAPCO	IMODCO	133,000	2-12″ & 2-20″/CALM	130
	1973	Djatibarang	Pertamina	IMODCO	150,000	3-20″/CALM	75
	1973	Ardjuna	ARCO	SBM	150,000	3-16″/CALM	138
	1973	Ardjuna	ARCO	SBM	200,000	2-16″/CALM	126
	1974	Bekapai	Total	SBM	100,000	2-8″/CALM	123
	1974	Ardjuna	ARCO	SBM	NA	SBS	140
	1975	Poleng	Cities Service	SBM	55,000	2-8″/SBS	180
	1976	Handil	Total	SBM	125,000	2-20″/CALM	105
	1977	Balongan	Pertamina	SBM	150,000	2-20″ & 1-16″/CALM	74
	1978	Udang	Conoco	SBM	93,000	2-8″/SBS	302
	1980	Cinta	IIAPCO	IMODCO	133,000	2-12″ & 2-20″/CALM	130
	1980	Semarang	Pertamina	SBM	17,000	1-16″/CALM	39
	1981	Krisna	IIAPCO	IMODCO	230,000	2-20″, 2-16″ & 1-6″/CALM	NA
	1981	Ardjuna	ARCO	SBM	56,000	1-6″/CALM	135
	1981	NA	LETJES	SOFEC	10,000	2-8″	60
	1981	Balikpapan	Pertamina	SBM	150,000	CALM	102
	1983	Lalang	BP	Bluewater	140,000	Yoke Tower	NA
	1983	Balongan	Pertamina	SBM	35,000	1-16″/CALM	46
	1983	Arun	Mobil	Bluewater	100,000	CALM	
	1984	Kakap	Marathon	SBM	140,000	SBM	290
	1985	West Madura	Kodeco	Bluewater	100,000	CALM	330
	1985	Kepiting	Conoco	Comb. Eng.	100,000	FPSO/CBM	330

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
Iran	1970	Cyrus	Ipac	SBM	140,000	2-16"/CALM	141
	1971	Iman Hasan	SIRIP	IMODCO	250,000	2-16"/CALM	82
	1983	Iman Hassan	NIOC	SBM	250,000	CALM	160
	1985	Bushire	Smit Tak.	SBM	150,000	CALM	118
Iraq	1981	Arabian Gulf	Brown & Root	IMODCO	270,000	2-24"	NA
	1981	Arabian Gulf	Brown & Root	IMODCO	270,000	2-24"	NA
	1981	Arabian Gulf	Brown & Root	SBM	270,000	2-24"	NA
	1981	Arabian Gulf	Brown & Root	SBM	270,000	2-24"	NA
Italy	1963	Fimicino	PURFINA	IMODCO	50,000	2-12"/CALM	49
	1963	Ravenna	SAROM	IMODCO	50,000	2-12"/CALM	NA
	1964	Fiumicino	PURFINA	Dalmine	100,000	1-16"/RMD	NA
	1970	Porto Torres	Sardoil	SBM	255,000	2-20"/CALM	101
	1972	Ancona	API	Lavore Adriatica Maritime	300,000	NA	NA
	1972	Genoa	Port Authority	CIDONIO	500,000	2-20" & 2-12"	NA
	1978	Nilde	Agip	SBM	80,000	1-6"/SALS	312
	1981	Rospo Mare	Elf Italiana	EMH	35,000	2-10"	NA
	1981	Genoa	C.A.P.	Technomare	270,000	SALM (Inv).	
	1984	Vega	Montedison	EMH	250,000	SALMRA	394
	1985	Mila	Montedison	Bluewater	70,000	CALM/SYFPS	90
	1985	Nilde II	Agip	IMODCO	80,000	SALMRA/ENG	312
	1985	Rospo Mare	Elf	SBM	140,000	FSO/turret	230
Ivory Coast	1980	Bouet	Societe Invoirienne de Raffinage	IMODCO	250,000	3-24"/CALM	164
	1981	Espoir	Phillips	Bluewater	240,000	1-12"/CALM	279
Japan	1961	Niigata	Shell	Niigata	100,000	1-20"/CALM	NA
	1963	Oita	Kyushu Oil	IMODCO	100,000	2-12"/CALM	177
	1965	Yokkaichi	Showa-Yokkaichi	Mitsubishi	100,000	2-16" & 1-16"/CALM	NA
	1965	Yokkaichi	Showa-Yokkaichi	Mitsubishi	100,000	2-16" & 1-16"/CALM	NA
	1965	Chiba	Maruzen Oil	IMODCO	100,000	3-12"/CALM	NA
	1967	Koshiba	US Army	IMODCO	100,000	2-12"/CALM	65
	1968	Hakozaki	US Army	IMODCO	100,000	2-16" & 2-12"/CALM	60
	1968	Kawasaki	Showa-Mitsubishi	Mitsubishi	265,000	2-24"/CALM	NA
	1968	Hakodate	Asia Oil	IMODCO	32,000	1-16"/CALM	49
	1968	Yokkaichi	Daikyo Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1968	Yokkaichi	Daikyo Oil	Mitsubishi	230,000	2-20"/CALM	NA
	1969	Toyama	Japan Sea Oil	IMODCO	150,000	2-16"/CALM	NA
	1969	Yokohama	Ogishima Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1969	Ube	Seibu Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1970	Atsumi	Chubu Electric	Mitsubishi	200,000	2-20"/CALM	NA
	1970	Himeji	Idemitsui Oil	IMODCO	220,000	2-20"/CALM	NA
	1970	Buckner Bay	Toyo Gasoline	IMODCO	100,000	2-16"/CALM	NA
	1970	Tengan	US Army	IMODCO	50,000	2-12"/CALM	70
	1971	Nakagusuki Bay	Esso	Esso, Van Houten	250,000	2-24"/SALM	85
	1973	Ube	Seibu Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1974	Kawasaki	Showa-Mitsubishi	Mitsubishi	300,000	2-20"/CALM	NA
	1975	Yokohama	Oghishima Oil	Mitsubishi	200,000	2-20"/CALM	NA
	1976	Yokkaichi	Showa-Yokkaichi	Mitsubishi	300,000	1-20" & 1-20"/CALM	NA
	1981	Mutsu-Ogawara	JNOC	SOFEC	350,000	2-24"/SALM	145
	1983	Fuqui	JNOC	SOFEC	240,000	2-20"/SALM	148
S Korea	1987	Inchon	NCS/Kudong Oil Co.	SBM	N/A	CALM	N/A
Kuwait	1967	Ras Al Khafji	Arabian Oil	McDermott	150,000	1-16" & 1-12"	NA
	1972	Ras Al Khafji	Arabian Oil	McDermott	250,000	1-24" & 1-10"	NA
	1977	Mina-Al-Ahmadi	KOC	ETPM	532,000	2-24" & 1-16"/RMD	NA
	1980	Ras al Kahfji	Arabian Oil	Mitsubishi	300,000	CALM	NA
Lebanon	1985	Beruit	Elec du Liban	EMH	40,000	SALM	118
Libya	1962	Brega	Esso	Esso	100,000	Fixed Tower/ Loading Arm	NA
	1965	Ras-es-Sider	Oasis	SBM	100,000	3-16"/CALM	101
	1968	Zueitina	Occidental	SBM	100,000	1-24"/CALM	100
	1968	Zueitina	Occidental	SBM	150,000	2-24"/CALM	105
	1968	Zueitina	Occidental	SBM	150,000	2-24"/CALM	105
	1969	Brega	Esso	Esso Van Houten	300,000	1-24"/SALM	140

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
	1969	Ras Lanuf	Mobil	SBM	255,000	2-24"/CALM	96
	1969	Ras-es-Sider	Oasis	SBM	255,000	2-24"/CALM	101
	1974	Azzawiya	NOC	DBV/Woodfield	100,000	2-16"	NA
	1974	Azzawiya	NOC	DBV/Woodfield	30,000	1-8" & 1-10"	NA
	1976	Azzawiya	NOC	SBM	140,000	2-20"/SALM	85
	1976	Azzawiya	NOC	SBM	100,000	2-20"/SALM	98
	1979	Zueitina	Occidental	IMODCO	275,000	2-24"/CALM	99
	1980	Ras-es-Sider	Oasis	SBM	300,000	2-24"/CALM	102
	1983	Ras-es-Sider	Oasis	IMODCO	NA	CALM	NA
	1984	Marsa el Brega	Sirte Oil	SBM	300,000	CALM	148
Malaysia	1959	Miri	Shell	SBM	70,000	2-8" & 1-6"/CALM	48
	1959	Miri	Shell	SBM	70,000	2-12" & 1-16"/CALM	48
	1962	Miri	Shell	SBM	70,000	2-8" & 1-6"/CALM	48
	1962	Port Dickson	Shell	SBM	100,000	2-16"/CALM	90
	1963	Miri	Shell	SBM	70,000	2-12" & 1-6"/CALM	53
	1974	Labuan	Shell	SBM	313,000	2-20"/CALM	98
	1974	Tembungo	Exxon	SOFEC	94,000	1-10"/SALM	300
	1974	Pulai	Exxon	SBM	190,000	1-12"/SALM	240
	1977	Pulai	Exxon	SBM	166,000	SALS	216
	1978	Bintulu	Shell	SBM	210,000	2-20"/CALM	67
	1981	Trengganu	Petronas	SOFEC	85,000	2-20"/SALM	60
	1981	Trengganu	EPMI	SBM	250,000	1-24"/SALM	92
	1981	Trengganu	EPMI	SBM	250,000	1-24"/SALM	85
	1981	Paka	JGC Corp.	SOFEC	85,000	CALM	65
	1982	Port Dickson	Shell	Mitsubishi	100,000	CALM	
	1984	Lutong	Shell	SBM	125,000	CALM	77
	1984	Lutong II	Shell	SBM	125,000	CALM	77
Mexico	1973	Tuxpan	Pemex	IMODCO	60,000	2-16"/CALM	60
	1974	Tuxpan	Pemex	IMODCO	60,000	1-10" & 3-16"/CALM	67
	1976	Salina Cruz	Pemex	IMODCO	60,000	3-16" & 1-12"/CALM	75
	1976	Rosarito Beach	Pemex	IMODCO	60,000	1-20" & 2-16"/CALM	77
	1978	Rabon Grande	Pemex	IMODCO	150,000	1-16" & 2-20"/CALM	90
	1980	Cayo Arcas	Pemex	IMODCO	151,000	2-24" & 1-16"/CALM	144
	1980	Doc Bocas	Pemex	SBM	250,000	2-24" & 1-16"/CALM	93
	1981	Cayo Arcas	Pemex	SBM	250,000	2-20" & 1-16"/CALM	151
	1981	Dos Bocas	Pemex	SBM	250,000	2-24" & 1-16"/CALM	93
	1981	Salina Cruz	Pemex	Mitsubishi	250,000	2-24" & 1-16"/CALM	NA
	1981	Cayo Arcas	Pemex	EMH	285,000	2-20"/RMD	131
	1981	NA	Pemex	SOFEC	2,000	SBBM (21)	150
	1985	Unknown	Pemex	Mitsubishi	150,000	CALM	93
Morocco	1971	Mohammedia	RAPC	IMODCO	100,000	1-8" & 1-20"/CALM	72
New Caledonia	1977	Noumea	Le Nickel	SBM	100,000	1-20"/CALM	62
New Zealand	1971	Waipipi Point	Marcona Corp.	IMODCO	75,000	1-12"/CALM	64
	1972	Taharoa	New Zealand Steel	IMODCO	70,000	2-12"/CALM	77
	1976	Taharoa	New Zealand Steel	SBM	150,000	2-12"/CALM	105
Nigeria	1967	Lagos	Nidogas	IMODCO	2,000	1-3" & 1-4"/CALM	13
	1968	Escravos	Gulf	IMODCO	100,000	2-16"/CALM	70
	1968	Forcados	Shell	SBM	210,000	1-20"/CALM	83
	1968	Forcados	Shell	SBM	210,000	-124"/CALM	83
	1971	Qua Iboe	Mobil	IMODCO	255,000	2-24"/CALM	90
	1971	Forcados	Shell	SBM	313,000	1-24"/CALM	91
	1971	Bonny	Shell	SBM	313,000	1-24"/CALM	91
	1971	Bonny	Shell	SBM	313,000	1-24"/CALM	91
	1972	Brass River	Agip	IMODCO	200,000	2-20"/CALM	96
	1974	North Apoi	Texaco	SBM	50,000	2-20" & 1-12"/CALM	87
	1974	North Apoi	Texaco	SBM	250,000	2-20"/CALM	93
	1976	Brass River	Agip	IMODCO	250,000	2-20"/CALM	95
	1977	North Apoi	Texaco	SBM	250,000	2-24"/CALM	94
	1977	Escravos	Gulf	SBM	300,000	2-24"/CALM	102
	1979	Qua Iboe	Mobil	IMODCO	300,000	2-24"/CALM	95
	1984	OPL 98 Block	Ashland	SBM	285,000	S-Y Jacket	140
	1985	Bonny	Shell	Bluewater	350,000	CALM	92
	1987	Brass	NAOC	SBM	N/A	CALM	N/A
North Yemen	1986	Salif	YEPCO	SOFEC	N/A	Turrent moored FSO	N/A
	1987	Ras Isa	YEPCO	SBM	N/A	CALM	N/A
Norway	1970	Ekofisk	Phillips	SBM	60,000	1-12"/CALM	232
	1970	Ekofisk	Phillips	SBM	150,000	1-12"/CALM	208
	1976	Statfjord	Mobil	CFEM	125,000	2-20"/AC	NA
	1979	Statfjord B	Mobil	SBM	150,000	1-20"/ALP	480
	1982	Statfjord C	Mobil	SBM	150,000	1-20"/ALP	478

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
Oman	1963	Mina-al-Fahal	P.D. Oman	SBM	100,000	2-8"/CALM	71
	1966	Mina-al-Fahal	P.D. Oman	SBM	165,000	2-16" & 1-8"/CALM	115
	1966	Mina-al-Fahal	P.D. Oman	SBM	165,000	2-20" & 2-8"/CALM	124
	1973	Mina-al-Fahal	P.D. Oman	SBM	500,000	2-20" & 2-8"/CALM	155
	1979	Mina-al-Fahal	P.D. Oman	SBM	350,000	2-20" & 2-12"/CALM	124
	1984	Kuria Muria	Shell	SBM	250,000	CALM	125
Panama	1981	Chiriqui Grande	Petroterminal de Panama	EMH	150,000	2-20"/CALM	NA
	1981	Chiriqui Grande	Petroterminal de Panama	EMH	150,000	2-20"/CALM	NA
	1983	Chiriqui Grande	Petroterminal de Panama	EMH	150,000	2-20"/CALM	NA
Philippines	1967	Subic Bay	US Navy	IMODCO	108,000	2-16" & 1-10"/CALM	85
	1978	Nido	Cities Service	SBM	70,000	1-12"/CALM	200
	1980	Cadiao	Amoco	SBM	127,000	1-12"/CALM	300
	1980	Bataan	Bataan Refining	SOFEC	300,000	2-24"/SALM	94
	1982	Nido	Cities Service	Bluewater	55,000	2-10"/CALM	219
Qatar	1965	Halul	QGPC	SBM	100,000	2-16"/CALM	97
	1972	Halul	QGPC	McDermott	300,000	2-24"	NA
	1972	Umm Said	QGPC	IMODCO	300,000	1-20" & 1-24"/CALM	66
	1976	Doha	QGPC	SBM	65,000	1-6"/CALM	88
	1979	Halul	QGPC	SBM	540,000	2-20" & 1-10"/CALM	120
	1983	Umm Said	QGPC	IMODCO	500,000	CALM	NA
Saudi Arabia	1970	Zuluf	Aramco	SBM	250,000	2-24" & 1-16"/CALM	111
	1970	Zuluf	Aramco	SBM	450,000	2-24"/CALM	129
	1974	Ju'aymah	Aramco	McDermott	500,000	2-24" & 1-12"	NA
	1974	Ju'aymah	Aramco	McDermott	500,000	2-24" & 1-12"	NA
	1974	Ju'aymah	Aramco	McDermott	500,000	2-24" & 1-12"	NA
	1975	Ju'aymah	Aramco	SOFEC	750,000	2-24" & 1-12"/CALM	135
	1975	Ju'aymah	Aramco	SOFEC	750,000	2-24" & 1-12"/SALM	117
	1981	Ras Al Khafji	Aramco	Mitsubishi	300,000	1-24" & 1-10"/CALM	NA
	1987	Duba	ODR	SBM	N/A	CBM	N/A
Singapore	1971	Singapore Harbor	Esso	IMODCO	252,000	2-24"/CALM	88
	1974	Pulau Bukom	Shell	McDermott	300,000	2-24"	NA
	1980	Singapore Harbor	PSA	IMODCO	300,000	2-24"/CALM	105
South Africa	1969	Durban	Shell	SBM	210,000	2-20"/CALM	150
	1974	Durban	Shell	SBM	210,000	1-20"/CALM	150
South Korea	1963	Ulsan	KOC	IMODCO	75,000	2-12", 1-8" & 1-4"/CALM	65
	1969	Yosu	Honam Oil	IMODCO	100,000	2-16"/CALM	112
	1969	Ulsan	KOC	IMODCO	200,000	2-16" & 1-12"/CALM	88
	1977	Onsan	KIPCO	IMODCO	250,000	2-24"/CALM	90
	1980	Pusan	KOC	Mitsubishi	325,000	2-24" & 1-16"	NA
Spain	1966	Huelva	Rio Tinto	SBM	100,000	2-16"/CALM	75
	1971	Amposta	Shell	SBM	33,530	2-10"/CALM	209
	1973	Tarragona	Enpetrol	SBM	325,000	2-24" & 1-12"/CALM	135
	1975	Algeciras	Cepsa	DBV/Woodfield	500,000	2-20" & 1-12"	NA
	1976	Castellon	Shell	SBM	55,000	SALS	383
	1979	Badalona	Campsa	SOFEC	50,000	2-12"/SALM	107
Sri Lanka	1985		CPC	IMODCO	180,000	CALM	95
Sudan	1983	Marsa Nimeiri	Chevron	SBM	250,000	CALM (HEX)	100
Sweden	1959	Dalaro	Swedish Navy	IMODCO	3,000	1-4"/CALM	150
Taiwan	1967	Tai-Chung	US Air Force	IMODCO	50,000	1-12"/CALM	76
	1968	Kaohsiung	CPC	IMODCO	100,000	2-16" & 1-10"/CALM	68
	1968	Tai-Chung	US Air Force	IMODCO	50,000	1-12"/CALM	76
	1971	Kaohsiung	CPC	SBM	250,000	2-20"/CALM	100
	1972	Kaohsiung	CPC	SBM	250,000	2-20"/CALM	115
	1979	Chu-Wei	CPC	IMODCO	250,000	2-20"/CALM	121
	1981	Ta-Lin-Po	CPC	SBM	250,000	2-24" & 1-16"/CALM	130
Tanzania	1971	Dar-Es-Salaam	Tanzanian Harbour Authorities	SBM	100,000	2-20"/CALM	78

Single point mooring around the world—*continued*

Country	Year	Port/Field	Owner	Designer/ Contractor	Max. Vessel Size (Dwt)	Hose number-Size/System	Water Depth (Ft.)
	1982	Dar Es Salaam	T.H.A.	IMODCO	300,000	CALM	
Thailand	1979	Gulf of Thailand	Union	Bluewater	70,000	1-8"/CALM Yoke	NA
	1981	Erawan	Union	Bluewater	85,000	1-8"/CALM	219
Trinidad	1971	Galeota Point	Amoco	SBM	250,000	2-20"/CALM	95
	1973	Point-A-Pierre	Texaco	IMODCO	260,000	1-12" & 2-24"/CALM	78
	1976	Galeota Point	Amoco	IMODCO	250,000	2-20"/CALM	95
Tunisia	1972	Ashtart	Aquitaine	SBM	70,000	SBS	220
	1974	Ashtart	Aquitaine	SBM	100,000	1-20"/CALM	220
	1978	Ashtart	Serept	SBM	137,000	1-20" & 1-10"/SBS	220
	1982	Tazerka	Shell/Tunirex	SBM	210,000	SALS	470
United Arab Emirates	1968	Fateh	Conoco	SBM	150,000	2-16"/CALM	103
	1972	Das Island	BP	IMODCO	300,000	2-24" & 1-16"/CALM	94
	1972	Fateh	Dubai Petroleum	McDermott	300,000	2-24"	NA
	1972	Mubarras Island	ADOC	SBM	200,000	1-24"/CALM	58
	1973	Mubarek	Crescent	SBM	350,000	2-20" & 1-16"/CALM	160
	1974	Abu-Al-Bu-Koosh	Total/ABK	SBM	100,000	2-12"/CALM	97
	1977	Das Island	ADMA	IMODCO	400,000	2-24" & 1-16"/CALM	94
	1977	Arzanah	Amerada Hess	SBM	252,000	1-12"/CALM	107
	1979	Fateh	Dupetco	IMODCO	120,000	2-20"/CALM	130
	1980	Zirku	Zadco	IMODCO	350,000	2-20" & 1-20"/CALM	95
	1980	Zakum Zirku	Zadco	IMODCO	350,000	2-20" & 1-20"/CALM	95
	1981	Sharjah	Amoco	SBM	300,000	1-20"/CALM	65
	1981	Abu-Al-Koosh	Total	EMH	232,799	1-10"	NA
	1983	Salah	Gulf Ras al Khaimah	IMODCO	300,000	CALM	100
United Kingdom	1965	Nore Estuary	BP	BP/Harland Wolff	100,000	NA	NA
	1970	Humber River	Conoco	SBM	210,000	1-24"/CALM	74
	1972	Auk	Shell/Esso	Shell/SBM	42,000	1-10"/ELSBM	280
	1973	Argyll	Hamilton Bros.	SBM	100,000	1-12"/CALM	252
	1975	Brent	Shell/Esso	Shell/HC	90,000	NA	NA
	1975	Anglesey	Shell	SBM	750,000	2-24" & 1-16"/CALM	127
	1975	Scapa Flow	Occidental	Micoperi	250,000	NA	NA
	1975	Scapa Flow	Occidental	Micoperi	250,000	NA	NA
	1975	Thistle	BNOC	SBM	80,000	2-16"/SALM	535
	1977	Brent	Shell	SBM	80,000	1-16"/CALM	460
	1978	Buchan	BP	IMODCO	107,000	1-12"/CALM	369
	1979	Ninian	Chevron	IMODCO	3,500	SBBM	433
	1980	Ninian	Chevron	IMODCO	3,500	SBBM(4)	433
	1982	Maureen	Phillips	EMH	85,000	1-16"/AC	NA
	1980	Humber River	Conoco	SBM	280,000	1-24"/CALM	74
	1982	Beryl B	Mobil	EMH	80,000	1-16"/ALP	NA
	1984	Cardigan Bay	M.O.D.	Havron	10,000	SPLM	100
	1985	Fulmar	Shell	Bluewater	100,000	ALPRA/HEAD	360
	1985	Beryl A	Mobil	EMH	100,000	ALP	
United States	1967	Louisiana	Kerr-McGee	McDermott	8,000	1-4"	NA
	1978	Worldwide (portable)	US Navy	IMODCO	70,000	2-10"/CALM	65-200
	1980	Louisiana	Loop	SOFEC	700,000	2-24"/SALM	110
	1980	Louisiana	Loop	SOFEC	700,000	2-24"/SALM	112
	1980	Louisiana	Loop	SOFEC	700,000	2-24"/SALM	114
	1981	Santa Ynez	Exxon	IMODCO	50,000	1-12", 1-8", 6-1" & 1-6"/SALM	494
Uruguay	1975	Jose Ignacio	Ancap	SBM	150,000	2-24"/CALM	64
	1985	Jose Ignacio	Ancap	SBM	150,000	CALM	64
Venezuela	1968	Moron	CVP	SBM	100,000	2-16"/CALM	63
Viet Nam	1984	White Tiger	Sudoimport	SBM	35,000	S-Y CALM	
West Germany	1962	Cuxhaven	West Germany Navy	IMODCO	2,500	1-4"/CALM	26
Western Sahara	1961	El Aaiun	CEPSA	IMODCO	3,000	1-6"/CALM	28
Zaire	1975	Zaire	Gulf	IMODCO	100,000	2-16"/CALM	71
	1976	Zaire	Gulf	IMODCO	79,200	2016"/CALM	79

mile or be capable of running on methanol. By 2000 that percentage would jump to 25%. In New Mexico, early last year, the Oxygenated Fuels Working Group of the state's Health and Environment Department submitted a draft proposal to the governor mandating that alcohol fuels be made available at service stations and proposing laws to promote the use of those fuels.

Worldwide, refiners have not had to face as many regulations, but lead phasedown is under way in Europe and the United Kingdom, and Germany is greatly concerned with acid rain problems that could spur fuel sulfur limits.

Because U.S. refiners will have already faced a number of these regulations, European and British governments will have strong precident to pass new rules in their respective countries.

Europe moves to unleaded gasoline

Oil companies in the 12 European Economic Community (EEC) countries will be required to have a single premium grade of unleaded gasoline with a minimum octane quality of 95 research octane (RON) and 85 motor octane (MON) widely available by 1989. Member states also have the option of introducing a regular unleaded grade.

West Germany, Holland, Denmark, Austria, Norway, Sweden, and Britain have given tax incentives to defray the additional cost of producing and distributing relatively small volumes of unleaded fuel.

Unleaded is widely available in these countries, except in Britain. In the large West German market, unleaded accounts for about 20% of sales. The key to real expansion of the unleaded market will be introduction of emission control regulations that will require vehicles to be fitted with catalytic converters that would be poisoned by leaded fuel.

Compliance with the rules will be phased in, but all new vehicles must meet higher emission standards by 1991. Some smaller vehicles will be able to meet the new standards with lean-burn engines, but they must still be able to operate with unleaded gasoline.

Experience in Europe shows that even with tax incentives, the move to unleaded gasoline and cars with catalytic converters has been slow, and is unlikely to disrupt supply.

West Germany, perhaps the most environmentally conscious country in Europe, enacted tax incentives of up to $1,000 for vehicles that meet the new EEC emission standards or 1983 U.S. standards. About 35% of West German car sales are low emission vehicles, but about 80% of those have diesel engines.

The only other EEC country with fiscal incentives to switch to low emission vehicles before the madatory deadline is Holland. Purchasers there can get discounts of $330 for cars with engines smaller than 1,400 cc and $670 for larger cars.

The 1983 U.S. emission standards became compulsory in Switzerland in October 1987. Tax incentives of as much as $400 are available, and cars equipped with catalytic converters make up about 25% of that small market.

Austria will adopt 1983 U.S. emission standards this year and Sweden in 1989. Both of these countries have tax incentives, but neither is an EEC member.

U.S. outlook shows improved margins by 1990

Increasing demand for higher quality refined products will begin to erode refiners' ability to meet product needs, giving the U.S industry the best opportunity for profitability and stability it has had in years, according to Turner, Mason & Co. (TMC), Dallas late last year.

Refiners will not be able to meet demand for more premium grade and higher octane gasoline in 1990 without adding capacity and upgrading plants.

Demand in growth for premium products and fierce retail marketing competition mark a fundamental shift in the industry: a return to dominance by market forces rather than regulation.

In 1987, gasoline demand was 7.165 million b/d and is projected to increase to 7.22 million b/d in 1988. Gasoline prices averaged 95.7¢/gal in 1987.

The lead phasedown program caused gasoline octane to decline during the past 16 years. And although most refiners upgraded plants or added octane production capacity, they may have to produce 89 clear pool octane to meet demand, according to TMC. Previous estimates showed that refiners would be required to produce 87 clear pool octane.

Some observers also previously thought that premium octane would peak at 91 octane, but some companys' aggressive promotion of 93 octane premium will further strain octane production capability, says TMC.

The industry's gasoline manufacturing capability will determine the outlook for refiners' margins in the next few years, says TMC. Surplus gasoline capacity slipped by about 8.5% in 1986.

A continued decline in the surplus coupled with an increased demand for premium fuels will squeeze refiners' capabilities to meet the demand presented by today's gasoline pool. An underlying tightness in gasoline supply capability will revive margins somewhat in the near term, says TMC.

A modest 1% growth to 1990 in gasoline demand for octane will restore the market forces needed to spur refiners to install more high quality gasoline processing capability through capital investment and operating improvements. And imports will not be able to take up the slack PE

Petrochemical producers enjoy strong demand, profitability

PETROCHEMICAL PRODUCERS WORLDWIDE MOVED into a period of high utilization and good profitability last year. That contrasted sharply with the early 1980s when surplus capacity, lagging demand, and poor profitability had producers struggling to stay in business.

The improved strength is the result of the drop in crude oil prices in 1986 that substantially reduced the cost of petrochemical plant feedstocks; and the increased demand for petrochemical derivatives, particularly plastics, caused by stable economic conditions in the U.S. and abroad.

These reasons, coupled with the reductions in energy usage forced upon the industry by high feedstock costs in the early years of this decade, put the industry in a position of good profitability.

The outlook for strong demand and profitability in the next few years caused many companies to announce plant expansions and improvements. Technological improvements were a strong part of many of the petrochemical

U.S. petrochemical supply/demand

Product	1986 production	1987 capacity	1987 demand	1990 demand
	Billion lb/year			
Ethylene	33.00	35.00	34.30	36.00-36.50
Propylene	17.30	*22.00	18.50	20.00
Styrene monomer	7.50	8.25	8.00	8.80
HDPE	7.20	†7.80	7.60	8.20
LDPE, Lidpe	8.90	§10.90	9.50	10.40

Ethylene capacity by country

	1,000 metric tons/year		
	1985	1986	1987
North America			
U.S.	17,298	16,778	16,820
Canada	2,242	2,242	2,242
Total	**19,540**	**19,020**	**19,020**
Latin America			
Argentina	253	253	254
Bolivia	230	230	230
Brazil	1,427	1,428	1,461
Chile	60	60	60
Colombia	115	115	115
Mexico	932	932	932
Puerto Rico	413	413	413
Venezuela	150	150	150
Total	**3,580**	**3,581**	**3,615**
Western Europe			
Austria	285	285	320
Belgium	520	520	520
Finland	200	200	200
France	2,270	2,415	2,400
West Germany	3,990	3,660	3,790
Greece	15	15	15
Italy	1,485	1,485	1,485
The Netherlands	2,260	2,260	2,285
Norway	300	300	390
Portugal	300	300	300
Spain	956	956	966
Sweden	360	365	365
Switzerland	30	30	30
U.K.	2,270	1,995	1,845
Total	**15,291**	**14,786**	**14,911**
Asia/Pacific			
Australia	420	420	420
India	252	252	256
Japan	5,581	5,418	5,357
Korea	505	505	505
Singapore	300	300	300
Taiwan	953	953	953
Total	**8,011**	**7,848**	**7,791**
Other			
Algeria	120	364	364
Iran	26	26	26
Israel	24	130	130
Qatar	280	280	280
Saudi Arabia	1,611	1,611	1,611
South Africa	150	150	150
Turkey	355	355	355
Total	**2,566**	**2,916**	**2,916**
World total	**48,988**	**48,151**	**48,295**

* As of June 1, 1987.

Ethylene and its derivatives in western Europe

(1,000 metric tons of ethylene equivalent)	1985	1990
LDPE/LLDPE	4.650	5.000
HDPE	2.050	2.300
Ethylene oxide	1.300	1.300
Ethylene dichloride	2.300	2.450
Ethyl benzene	850	900
Others	1.250	1.550
Ethylene consumption	12.400	13.500
Net foreign trade	– 200	– 200
Ethylene production	12.000	13.300
Nameplate capacity	14.400	14.250
Rate of utilization, %	84	95

Source: Petrofina S.A.

Propylene and its derivates in western Europe

(1,000 metric tons of propylene equivalent)	1985	1990
Polypropylene	2.500	3.100
Acrylonitrile	1.250	1.300
Cumene	650	660
Propylene oxide	770	820
Isopropyl alcohol	450	470
Others	1.650	8.050
Propylene consumption	7.270	8.050
Net foreign trade	–270	–250
Propylene production	7.000	7.800
Nameplate capacity	8.500	8.700
Rate of utilization, %	82	90

Source: Petrofina S.A.

projects announced around the world.

Most of the projects were not grass-roots plants, but revamps and debottlenecking projects to improve production capacity and operating efficiency.

Massive restructuring and rationalization in the industry during the last few years caused most olefins plants to boost utilization to more than 90% in the U.S. and Europe, effectively full capacity.

Strong demand spurs expansions, acquisitions

Strong forecast demand for the basic petrochemcials spurred capacity increases worldwide.

China has more than doubled its ethylene capacity in the last 2 years. That increase was announced at the start up of the first phase of the Qilu ethylene complex. This plant, and the opening of a facilities at Daqing and Nanjing last year added 900,000 metric tons/year to China's capacity.

Mexico's Petroleos Mexicanos (Pemex) expected to complete by the end of last year, the first phase of construction of its Ciudad Morelos petrochemical complex.

The 3.8 million metric ton/year facility occupies 888 acres in the Pemex Pajaritos and La Cangrejera petrochemical complexes. The complex's 13 plants will boost the number of basic petrochemicals produced by the facility to 46 from 34. Later phases of the expansion will include plants to produce 30,000 metric tons/year of methyl tertiary butyl ether, 60,000 metric tons/year of isopropene, and 60,000 metric tons/year of propylene oxide.

In the U.S., newly formed Cain Chemical Inc., bought 7 Texas Gulf Coast petrochemical plants for more than $1 billion. With the acquisitions, Cain became the second

Survey of operating refineries worldwide

(capacities of January 1, 1988)

Country	No. plants	b/cd Crude	Catalytic cracking	Catalytic reforming
Abu Dhabi	2	180,000	....	30,055
Algeria	4	464,700	....	55,600
Angola	1	32,100	....	1,900
Argentina	11	681,500	112,450	39,600
Australia	10	637,100	184,800	154,800
Austria	1	204,000	24,000	32,000
Bahrain	1	250,000	36,000	17,100
Bangladesh	1	31,200	....	1,650
Barbados	1	3,000	....	....
Belgium	4	630,500	102,000	80,300
Bolivia	3	46,930	....	14,158
Brazil	13	1,407,300	350,500	24,800
Brunei	1	10,000	....	....
Burma	2	26,300	....	....
Cameroon	1	43,000	....	6,500
Canada	27	1,868,900	385,550	368,650
Chile	2	141,000	37,000	5,300
China, Taiwan	2	600,000	25,000	62,500
Colombia	4	226,000	91,000	6,000
Congo	1	21,000	....	2,000
Costa Rica	1	16,200	....	1,200
Cote d'Ivoire	2	60,000	....	16,600
Cyprus	1	16,000	....	3,400
Denmark	3	177,000	....	31,100
Dominican Republic	2	48,500	....	7,900
Ecuador	3	123,300	16,000	2,780
Egypt	8	489,203	....	30,940
El Salvador	1	17,000	....	3,800
Ethiopia	1	18,000	....	2,200
Finland	2	241,000	41,800	42,900
France	14	1,940,600	288,800	258,700
Gabon	1	23,000	....	1,500
Germany	16	1,647,800	174,700	307,100
Ghana	1	28,000	....	5,550
Greece	4	384,500	50,500	51,300
Guatemala	1	16,000	....	3,000
Honduras	1	14,000	....	1,800
Hungary	3	220,000	20,000	23,000
India	12	1,058,742	133,470	26,690
Indonesia	6	714,200	12,600	62,100
Iran	4	530,000	....	63,845
Iraq	8	318,500	....	43,500
Ireland	1	56,000	....	11,000
Israel	2	180,000	20,000	26,000
Italy	20	2,581,100	277,400	289,600
Jamaica	1	35,500	....	3,540
Japan	43	4,566,650	557,150	533,940
Jordan	1	100,000	4,410	8,640
Kenya	1	90,000	....	9,000
Korea	5	820,000	....	59,450
Kuwait	4	628,000	30,000	51,000
Lebanon	2	37,000	7,250	7,492
Liberia	1	15,000	....	2,000
Libya	3	329,400	....	13,982
Madagascar	1	16,350	....	2,600
Malaysia	4	212,300	....	21,410
Martinique	1	12,800	....	7,410
Mexico	9	1,354,000	267,000	157,800
Morocco	2	154,600	5,600	26,800
Netherlands	7	1,381,000	125,500	157,400
Netherlands Antilles	1	320,000	42,000	15,000
New Zealand	1	81,700	....	21,700
Nicaragua	1	14,500	....	2,800
Nigeria	3	270,000	47,000	39,700
Norway	3	240,000	....	29,150
Oman	1	76,932	....	15,386
Pakistan	3	130,050	....	5,450
Panama	1	100,000	....	7,500
Paraguay	1	7,500	....	....
Peru	6	182,018	21,305	1,680
Philippines	3	286,000	23,100	40,200
Portugal	3	294,300	10,100	35,400
Puerto Rico	2	123,000	12,000	5,800
Qatar	1	62,000	....	12,030
Saudi Arabia	7	1,375,000	76,000	178,900
Senegal	1	29,800	....	2,870
Sierra Leone	1	10,000	....	....
Singapore	5	858,000	....	54,300
Somalia	1	10,000	....	....
South Africa	4	433,500	84,400	62,800
Spain	10	1,305,000	143,500	189,100
Sri Lanka	1	50,000	....	3,750
Sudan	1	21,440	....	1,700
Sweden	5	436,500	27,000	72,700
Switzerland	2	132,000	....	26,000
Syria	2	228,790	....	19,346
Tanzania	1	13,500	....	3,000
Thailand	3	191,860	9,250	25,300
Togo	1	20,000	....	4,400
Trinidad	2	300,000	25,000	31,000
Tunisia	1	34,000	....	3,300
Turkey	5	675,595	34,100	65,370
United Kingdom	15	1,802,700	392,000	367,500
Uruguay	1	45,000	5,000	3,000
Venezuela	6	1,201,100	193,100	6,000
Virgin Islands	1	545,000	....	125,000
Yemen, N.	1	10,000	....	2,500
Yemen, S.	1	170,000	....	12,000
Yugoslavia	7	607,635	52,050	74,612
Zaire	1	17,000	....	3,000
Zambia	1	23,750	5,040	5,040
Total	412	40,911,145	4,582,425	4,857,168

Country-by country refining survey

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
ABU DHABI			
Abu Dhabi National Oil Co.–Ruwais	120,000	....	[2]19,150
Umm Al-Nar 2	60,000	....	[4]10,905
Total	**180,000**	....	**30,055**
ALBANIA			
Government-owned refineries at Ballsh, Cerrik, Stalin.			
Total	**40,000**		
ALGERIA			
Sonatrach: Arzew	60,000	....	8,600
Hassi Messaoud	23,700	....	2,000
Maison Carree	58,000	....	15,000
Skikda	323,000	....	30,000
Total	**464,700**	....	**55,600**
ANGOLA			
Petrangol SARL–Luanda	**32,100**	....	[1]**1,900**
ARGENTINA			
Destileria Argentina de Petróleo SA–			
Lomas de Zamora	2,000	....	....
Esso SAPA–Campana	86,400	[1]24,850	[1]8,300
Galvan	17,800	....	....
Isaura SA–Bahia Blanca	12,000	....	....
Shell Cia. Argentina de Petróleo SA–			
Buenos Aires	121,700	[1]21,700	[1]10,800
Yacimientos Petroliferos Fiscales–			
Campo Duran	32,000	....	....
Dock Sud	4,000	....	....
La Plata	216,000	[1]45,000	[1]9,000
Lujan de Cuyo	129,000	[1]20,900	[1]9,000
Plaza Huincul	23,000	....	[2]2,500
San Lorenzo	37,600	....	....
Total	**681,500**	**112,450**	**39,600**
AUSTRALIA			
Ampol Refineries Ltd.–Lytton	65,000	26,000	[1]12,600
Australian Lubricating Oil Refinery Ltd.–Kurnell			
BP Australia–Brisbane	42,000	[1]15,800	[2]8,500
Kwinana	100,000	[1]24,000	[1]6,400
			[2]16,400
Caltex Refining CPL–Kurnell[1]	100,000	[1]39,000	[1]25,600
Mobil Oil Australia Ltd.–Adelaide			
Petroleum Refineries Australia PL–			
Adelaide	46,500		[2]16,000
Altona	98,600	[2]24,000	[2]28,000
Shell Refining (Australia) PL–Clyde	75,000	[1]31,000	[2]13,300
Geelong	110,000	[1]25,000	[2]8,000
			[5]20,000
Total	**637,100**	**184,800**	**154,800**

Solvent extraction: [1]4,800 b/cd

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
AUSTRIA			
OeMV–Schwechat	204,000	[1]24,000	[1]14,000
BAHRAIN			
Bahrain Petroleum Co. BSC (Closed) –Sitra	**250,000**	[1]**36,000**	[2]**17,100**
BANGLADESH			
Eastern Refinery Ltd.–Chittagong	**31,200**	....	[1]**1,650**
BARBADOS			
Mobil Oil Barbados Ltd.–Bridgetown	**3,000**	....	....
BELGIUM			
Belgian Refining Corp. NV–Antwerp	91,500	....	[2]12,000
Esso Inc.–Antwerp	218,000	[1]25,500	[4]38,100
Nynas Petroleum NV—Antwerp	15,000	....	....
SIBP NV–Antwerp	306,000	[1]76,500	[2]30,200
Total	**630,500**	**102,000**	**80,300**
BOLIVIA			
Yacimientos Petroliferos			
Fiscales Bolivianos–Cochabamba[1]	27,500	....	[1]7,758
Santa Cruz	16,430	....	[1]6,400
Sucre	3,000	....	....
Total	**46,930**	....	**14,158**

[1]Solvent extraction: 166 b/cd.

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
BRAZIL			
Petróleo Brasileiro SA: Araucaria,			
Paraná	151,000	[1]47,200	....
Betim, Minas Gerais	144,600	[1]34,100	....
Canoas, Rio Grande do Sul	72,300	[1]15,100	....
Cubatão, São Paulo	163,600	[1]53,400	[1]11,000
Duque de Caxias, Rio de Janeiro	226,600	[1]47,200	[1]13,800
Fortaleza, Ceará	....	....	....
Manaus, Amazonas	10,000	[1]2,000	....
Mataripe, Bahia	121,400	[1]27,700	....
Mauá, Santo André, São Paulo	32,500	[2]18,200	....
Paulínia, São Paulo	302,000	[1]44,000	....
São José dos Campos, São Paulo	164,000	[1]59,100	....
Refinaria de Petróleo Ipiranga SA–Rio Grande do Sul	9,300	[1]2,500	....
Refinaria de Petroleos de Manguinhos SA–Rio de Janeiro	10,000	....	....
		[3]4,400	
Total	**1,407,300**	**350,500**	**24,800**
BRUNEI			
Brunei Shell Petroleum CL–Seria	**10,000**	....	....
BULGARIA			
Government-owned refineries at Burgas, Pleven, Ruse			
Total	**300,000**		
BURMA			
Petrochemical Industries Corp.–Chauk	6,300	....	....
Syriam	20,000	....	....
Total	**26,300**	....	....
CAMEROON			
Sonara–National Refining CL–			
Cape Limboh, Limbe	**43,000**	....	[2]**6,500**
CANADA			
Alberta			
Husky Oil Operations Ltd.–Lloydminster	23,500	....	....
Imperial Oil Ltd.–Edmonton	164,900	[1]47,000	[1]20,900
Petro-Canada Products Inc.–			
Edmonton	121,100	[1]36,000	[2]12,600
Shell Canada Ltd.–Scotford	56,000	....	[6]18,450

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
Turbo Resources Ltd.–Balzac	27,500	[1]8,800	[2]7,550
Total	**393,000**	**91,800**	**59,500**
British Columbia			
Chevron Canada Ltd.–North Burnaby	35,000	[1]10,000	[2]10,500
Husky Oil Operations Ltd.–			
Prince George	9,500	[1]3,300	[2]1,400
Imperial Oil Ltd.–Ioco	42,800	[1]12,100	[3]6,700
Petro-Canada Products Inc.–			
Port Moody	37,200	[1]12,300	[2]8,600
Taylor	19,000	[1]6,300	[2]3,000
Shell Canada Ltd.–Shellburn, Burnaby	24,000	[1]5,400	[2]2,430
Total	**167,500**	**49,400**	**32,630**
New Brunswick			
Irving Oil Ltd.–St. John	237,500	[1]17,100	[2]34,650
Total	**237,500**	**17,100**	**34,650**
Newfoundland			
Newfoundland Processing Ltd.–			
Come By Chance	105,000	....	[2]26,000
Total	**105,000**	....	**26,000**
Northwest Territories			
Imperial Oil Ltd.–Norman Wells	2,900	....	....
Nova Scotia			
Imperial Oil Ltd.–Dartmouth	82,300	[1]22,600	[4]8,600
Texaco Canada Ltd.–Halifax	20,000	[1]7,200	[2]3,600
Total	**102,300**	**29,800**	**12,200**
Ontario			
Imperial Oil Ltd.–Sarnia	123,500	[1]23,000	[2]17,100
			[4]13,300
Petro-Canada Products Inc.–Clarkson	60,000	....	[5]9,800
Oakville	80,500	[1]25,400	[1]5,000
Shell Canada Ltd.–Sarnia	71,000	[1]14,400	[2]20,970
Suncor Inc.–Sarnia	70,000	[2]15,000	[2]26,000
Texaco Canada Ltd.–Nanticoke	95,000	[1]40,000	[6]24,000
Total	**500,000**	**118,800**	**127,670**
Quebec			
Petro-Canada Products Inc.–Montreal	87,400	[1]14,900	[2]31,300
Shell Canada Ltd.–Montreal	120,000	[1]21,150	[2]20,700
Ultramar Canada Inc.–St. Romuald	100,000	[1]30,000	[2]15,000
Total	**307,400**	**66,050**	**67,000**
Saskatchewan			
Consumers' Cooperative			
Refineries Ltd.–Regina	40,000	[1]12,600	[1]9,000
Petro-Canada Products Inc.–			
Moose Jaw	13,300	....	....
Total	**53,300**	**12,600**	**9,000**
Total Canada	**1,868,900**	**385,550**	**368,650**
CHILE			
Petrox SA–Talcahuano	72,000	[1]17,000	....
Refineria de Concón–Concón	69,000	[1]20,000	[1]5,300
Total	**141,000**	**37,000**	**5,300**
CHINA			
Government-owned refineries at Anshan, Beijing, Dalian, Daqing, Fushun, Hangzhou, Jinxi, Karamai-Dushanzi, Lanchow, Lenghu, Maoming, Nanchong, Nanjing, Shanghai, Shengli, Tianjin, Yumen			
Total	**2,200,000**		
CHINA, TAIWAN			
Chinese Petroleum Corp.–Kaohsiung	470,000	[1]25,000	[2]20,000
			[6]20,000
Tao-Yuan	130,000		[2]22,500
Total	**600,000**	**25,000**	**62,500**

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
COLOMBIA			
Empresa Colombiana de Petróleos			
–Barrancabermeja-Santander[1]	150,000	[1]62,000	[2]6,000
Cartagena, Bolivar	70,000	[1]29,000	....
Orito, Putumayo	1,000	....	....
Tibu, N. de Santander	5,000	....	....
Total	**226,000**	**91,000**	**6,000**
Solvent extraction: [1]35,000 b/cd.			
CONGO			
Coraf–Pointe-Noire	**21,000**	....	[2]2,000
COSTA RICA			
Refinadora Costarricense de Petroleo			
SA–Limón	**16,200**	....	[2]1,200
COTE d'IVOIRE			
Ste. Ivoirienne de Raffinage–Abidjan	50,000	....	[2]16,600
Ste. Multinationale de Bitumes–			
Abidjan	10,000	....	....
Total	**60,000**	....	**16,600**
CUBA			
Government-owned refineries at Cabaiguan, Havana, Santiago de Cuba.			
Total	**160,000**		
CYPRUS			
Cyprus Petroleum Refinery Ltd.–			
Larnaca	**16,000**	....	[2]3,400
CZECHOSLOVAKIA			
Government owned refineries at Bratislava, Kolin, Kralupi, Pardubice, Strazke, Zaluzi, Zyclen.			
Total	**455,000**		
DENMARK			
AS Dansk Shell–Fredericia	55,000	....	[2]12,000
Statoil AS–Kalundborg	65,000	....	[2]8,600
Kuwait Petroleum Refining			
(Danmark) A/S–Gulfhavn	57,000	....	[2]10,500
Total	**177,000**	....	**31,100**
DOMINICAN REPUBLIC			
Falconbridge Dominicana C por A–La			
Peguera	16,000	....	....
Refineria Dominicana de Petróleo			
SA–Haina	32,500	....	[1]7,900
Total	**48,500**	....	**7,900**
ECUADOR			
CEPE–Esmeraldas	90,000	[1]16,000	[2]2,780
Anglo Ecuadorian Oilfields Ltd.–			
Sta. Elena Peninsula	32,300	....	....
Texaco–Lago-Agrio	1,000	....	....
Total	**123,300**	**16,000**	**2,780**
EGYPT			
Alexandria Petroleum Co.–Alexandria			
(El-Mex)	99,250	....	....
Cairo Oil Refining Co.–Mostorod	125,060	....	[2]9,000
Tanta	21,800	....	....
El Ameria Oil Refining Co.–			
Alexandria	60,340	....	[2]9,400
El-Nasr Petroleum Co.–El-Suez	58,400	....	....
Wadi-Feran	9,680	....	....
Suez Oil Processing Co.–El-Suez	62,530	....	[2]12,540
Assiout	52,143	....	....
Total	**489,203**	....	**30,940**

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
EI SALVADOR			
Refinería Petrólera Acajutla SA–Acajutla	17,000	....	[1]3,800
Total	**17,000**	....	**3,800**
ETHIOPIA			
Ethiopian Petroleum Corp.–Assab	**18,000**	....	[1]2,200
FINLAND			
Neste Oy–Naantali	44,000	[2]13,300	[5]6,800
Porvoo	197,000	[1]28,500	[5]36,100
Total	**241,000**	**41,800**	**42,900**
FRANCE			
CRD—Total France–Gonfreville L'Orcher[1]	309,000	[1]30,100	[2]45,400
La Mède	136,000	[1]29,700	[4]23,400
Mardyck	122,000	[1]24,200	[4]20,500
Cie. Rhénane de Raffinage–Reichstett-Vendenheim	85,000	[1]14,000	[2]13,000
Elf France–Donges	200,000	[1]41,500	[2]27,300
Feyzin	170,800	[1]21,100	[3]8,400
Grandpuits	97,900	[1]27,200	[2]12,700
Esso SAF–Fos sur Mer	100,000	[1]17,000	[1]16,000
Port Jerome	136,000	[1]20,000	[1]16,000
Mobil Oil Francaise–Notre Dame de Gravenchon	57,000	....	[2]13,300
Shell Francaise–Berre l'Etang	128,000	[1]19,000	[2]15,000
Petit Couronne	217,000	[1]19,000	[2]42,000
Ste. Francaise des Petroles BP–Dunkirk	....	....	....
Lavera	181,900	[1]26,000	[1]5,700
Total	**1,940,600**	**288,800**	**258,700**

[1]Solvent extraction: 9,800 b/cd.

GABON			
Ste. Gabonaise de Raffinage–Port Gentil	**23,000**	....	[3]1,500
GERMANY, E.			
Government-owned	**470,000**		
GERMANY, WEST			
Deutsche BP-Erdol Ingolstadt–Vohburg†	102,000	[1]17,200	[1]17,200
Deutsche Marathon Petroleum GmbH–Burghausen	70,000	....	....
Deutsche Shell AG–Godorf	170,000	....	[2]17,000 [5]21,000
Harburg-Grasbrook	86,000	[1]15,000	[5]16,000
Deutsche Texaco AG–Heide	80,000	[2]9,000	[3]18,000
Erdol Raffinerie Duisburg GmbH–Duisburg	37,800	....	[2]7,300
Erdoel Raffinerie Neustadt GmbH–Neustadt-Donau	144,000	[1]22,700	[1]17,700
Esso AG–Ingolstadt	95,000	[1]19,800	[2]12,800
Karlsruhe	150,000	....	[2]27,900
Mobil Oil AG–Worth	93,000	[1]19,000	[2]15,900
Oberrheinische Mineralolwerke GmbH–Karlsruhe	142,000	[1]66,000	[4]11,400
Ruhr Oel GmbH–Gelsenkirchen	215,400	[1]6,000 [5]28,000	[1]11,900
Union Rheinische Braunkohlen Kraftstoff AG–Wesseling	95,000	....	[4]14,000
Wintershall AG–Lingen	91,400	....	[1]7,400
Mannheim	71,100	....	[2]18,400
Salzbergen	5,100	....	....
Total	**1,647,800**	**174,700**	**307,100**

†Operating on a semi-integrated basis.

GHANA			
Ghanaian Italian Petroleum CL–Tema	**28,000**	....	[1]5,550

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
GREECE			
Hellenic Aspropyrgos Refinery SA–Aspropyrgos	110,000	[1]23,300	[2]5,200 [2]9,500 [6]20,000
Motor Oil (Hellas) Corinth Refineries SA–Aghii Theodori	100,000	[1]27,200	[1]8,500
Petrola Hellas SA–Elefsis	108,000	....	....
Thessaloniki Refining Co. AE–Thessaloniki	66,500	....	[2]8,100
Total	**384,500**	**50,500**	**51,300**
GUATEMALA			
Texas Petroleum Co.–Escuintla	**16,000**	....	[2]3,000
HONDURAS			
Refinería Texas de Honduras SA–Puerto Cortes	**14,000**	....	[1]1,800
HUNGARY			
Dunai KV–Százhalombatta	150,000	[1]20,000	[2]23,000
Tiszai KV–Leninváros	60,000	....	....
Zalai KV–Zalaegerszeg	10,000	....	....
Total	**220,000**	**20,000**	**23,000**
INDIA			
Bharat Petroleum CL–Mahul, Bombay	140,000	[1]31,000	[1]5,200
Bongaigaon Refinery & Petrochemicals Ltd.–Bongaigaon, Assam	27,392	....	[2]1,930
Cochin Refineries Ltd.–Kerala	90,000	[1]19,100	[1]5,660
Hindustan Petroleum CL–Mahul, Bombay[1]	120,000	[1]12,000	....
Visakhapatnam	90,000	[1]20,000	....
Indian Oil CL–Barauni	66,000	....	....
Digboi	10,050	....	....
Gauhati	60,400	....	....
Gujarat	165,200	[1]19,800	[3]7,000
Haldia	55,000	....	[3]4,500
Mathura	120,000	[1]19,800	....
Madras Refineries Ltd.–Madras	114,700 [3]3,000	[1]11,770	[1]2,400
Total	**1,058,742**	**133,470**	**26,690**

[1]Solvent extraction: 10,000 b/cd.

INDONESIA			
Pertamina–Balikpapan, Kalimantan	221,500	....	[6]18,000
Cilacap, Central Java	271,200	....	[1]12,500 [6]18,000
Dumai, Central Sumatra	99,400	....	[1]5,600 [6]7,900
Musi, South Sumatra	81,400	[1]12,600	....
Pangakalan Brandan, North Sumatra	4,500	....	....
Sungai Pakning, Central Sumatra	36,200	....	....
Total	**714,200**	**12,600**	**62,100**
IRAN			
National Iranian Oil Co.–Esfahan	200,000	....	29,600
Shiraz	40,000	....	6,245
Tabriz	80,000	....	....
Tehran	210,000	....	28,000
Total	**530,000**	**....**	**63,845**

Note: Present status uncertain due to Iran-Iraq war.

IRAQ			
Oil Refineries Administration–Baiji	150,000	....	22,000 16,500
Basra	70,000	....	....
Daura	71,000	....	5,000

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
K3-Haditha	7,000	....	....
Khanaqin	12,000	....	....
Mufthia	4,500	....	....
Qaiyarah, Mosul	2,000	....	....
Iraqi Company for Oil Operations–Kirkuk	2,000	....	....
Total	**318,500**	**....**	**43,500**

Note: Present status uncertain due to Iran-Iraq war.

IRELAND

Irish Refining plc–Whitegate	**56,000**	**....**	[4]**11,000**

ISRAEL

Oil Refineries Ltd.–Ashdod	70,000	....	[2]10,000
Haifa	110,000	[1]20,000	[2]16,000
Total	**180,000**	**20,000**	**26,000**

ITALY

Agip Raffinazione–Rho, Milan	79,800	[2]13,700	[2]16,000
Sannazzaro, Pavia	210,000	[1]27,000	[2]10,000
Taranto	90,900	....	[2]16,000
ANIC SpA–Gela	80,000	[1]34,000	[2]10,000
Anonima Petroli Italiana–Falconara, Marittima	78,900	....	[2]10,500
Arcola Petrolifera SpA–La Spezia	18,000	....	....
ERG SpA–Genoa, San Quirico	130,000	....	[2]10,500
Esso Italiana SpA–Augusta, Siracusa	180,000	[1]45,300	[3]9,300 [4]7,300
Industrie Chimiche Italiane de Petrolio SpA–Frassino, Mantova	55,000	....	[2]9,500
Iplom SpA–Busalla	46,500	....	....
Irom–Industria Raffinazione Oli Minerali–Porto Marghera	90,000	....	[2]11,000
Isab–Melilli	220,000	....	[3]34,500
Mediterranea SpA–Milazzo	160,000	[1]28,000	[3]10,000
Mobil Oil Italiana SpA–Naples	100,000	[2]18,400	[2]12,500
Raffineria di Roma SpA–Rome	80,500	....	[2]14,200
Saras SpA–Sarroch	285,000	[1]63,000	[5]27,000
Sarpom–Trecate, Novara	241,500	[1]16,600	[2]18,900 [6]8,900
Selm-Soc. Energia Montedison–Priolo	240,000	[1]31,400	[3]9,000
Stanic–Livorno	100,000	....	[2]17,600
Tamoil Italia SpA–Cremona	95,000	....	[1]3,800
Total	**2,581,100**	**277,400**	**289,600**

JAMAICA

Petrojam Ltd.–Kingston	**35,500**	**....**	**3,540**

JAPAN

Asia Oil CL–Sakaide, Kagawa	133,000	[1]15,300	[2]9,000
Yokohama, Kanagawa	....	....	[2]12,600
Cosmo Oil CL–Chiba	209,000	[1]23,400	[2]22,500
Matsuyama	....	....	[2]4,500
Sakai	104,500	[1]17,550	[2]6,300
Yokkaichi City	166,250	[1]22,500	[2]3,600 [4]9,900
Fuji Oil CL–Sodegaura	153,700	[1]12,500	[2]13,600
General Sekiyu Seisei KK–Sakai	140,400	[1]32,500	[2]26,100
Idemitsu Kosan CL–Chita, Aichi	123,500	[1]27,000	[4]16,200
Himeji, Hyogo	104,500	....	[2]12,600
Ichihara, Chiba	199,500	[1]37,800	[2]6,840
Tokuyama, Yamaguchi	95,000	[1]20,700	....
Tomakomai, Hokkaido	85,500	....	[2]16,200
Kainan Petroleum Refining CL–Kainan	77,600	....	....
Kashima Oil CL–Kashima, Ibaragi	150,000	[1]17,500	[4]12,500
Koa Oil CL–Marifu	110,000	[1]16,000	[2]9,700
Osaka	80,000	[1]18,000	[2]9,000
Kyokuto Petroleum Ltd.–Chiba	120,000	....	[2]14,500
Kyushu Oil CL–Oita	130,000	[1]16,500	[2]8,000
Mitsubishi Oil CL–Kawasaki	55,000	....	[2]8,500
Mizushima	220,000	[1]34,000	[2]15,000 [4]15,200
Nansei Sekiyu KK–Nishihara, Okinawa	45,000	....	[1]5,400
Nichimo Sekiyu Seisei KK–Kawasaki	76,000	....	[1]7,600
Nihonkai Oil CL–Toyama	50,000	....	4,000
Nippon Mining CL–Chita	85,000	[1]13,000	[2]22,000
Funakawa	6,000	....	....
Mizushima	190,200	[1]38,000	[6]20,000
Nippon Oil CL–Niigata	26,000	....	[2]3,500
Nippon Petroleum Refining CL–Muroran	150,000	[1]19,000	[2]19,000
Nakagusuku, Okinawa	....	....	[2]2,000
Negishi	305,000	[1]39,000	[2]44,000
Yokohama	....	....	[2]1,300
Okinawa Sekiyu Seisei–Yonashiro, Okinawa	57,000	....	....
Seibu Oil CL–Yamaguchi	137,700	[1]18,100	[2]12,900
Showa Shell Sekiyu KK–Kawasaki	136,800	....	[2]19,100
Niigata	27,500	....	[2]4,300
Showa Yokkaichi Sekiyu CL–Yokkaichi	215,700	[1]22,600	[2]38,100
Taiyo Oil CL–Ehime	65,000	....	[2]6,000
Toa Nenryo Kogyo–Kawasaki	190,000	[1]68,400	[2]15,200
Wakayama	162,500	[1]27,800	[2]34,200
Toa Oil CL–Kawasaki	65,000	....	[2]11,000
Toho Oil CL–Owase	40,000	....	....
Tohoku Oil CL–Sendai	79,000	....	[2]12,000
Total	**4,566,850**	**557,150**	**533,940**

JORDAN

Jordan Petroleum Refinery–Zerka	**100,000**	[1]**4,410**	[2]**8,640**

KENYA

Kenya Petroleum Refineries Ltd.–Mombasa	90,000	....	[1]3,800 [2]5,200
Total	**90,000**	**....**	**9,000**

KOREA, N.

Government-owned, Unggi	**42,000**		

KOREA, S.

Honam Oil Refinery CL–Yosu	355,000	....	[2]15,300
Kukdong Oil CL–Busan[1]	10,000	....	....
Kyung In Energy CL–Inchon	60,000	....	[2]3,600
Ssangyong Oil Refining CL–Onsan[2]	90,000	....	[1]4,000
Yukong Ltd.–Ulsan	305,000	....	[2]17,650 [6]18,900
Total	**820,000**	**....**	**59,450**

Solvent extraction. [1]2,100 b/d. [2]8,000 b/d.

KUWAIT

Getty Oil Co. (subsidiary of Texaco Inc.)–Mina Al-Zour	70,000	....	....
Kuwait National Petroleum Co.–Mina Abdulla	75,000	....	....
Mina Al-Ahmadi	288,000	[1]30,000	[2]36,000
Shuaiba	195,000	....	[2]15,000
Total	**628,000**	**30,000**	**51,000**

LEBANON

Tripoli Oil Installations–Tripoli	20,000	[1]7,250	[2]4,392
Mediterranean Refining Co.–Sidon	17,000	....	[1]3,100
Total	**37,000**	**7,250**	**7,492**

LIBERIA

Liberia Petroleum Refining–Monrovia	**15,000**	**....**	[1]**2,000**

LIBYA

Azzawiya Oil Refining Co.–Azzawiya	120,000	....	[2]12,982
Ras Lanuf Oil & Gas Processing Co.–Ras Lanuf	201,000	....	....
Sirte Oil Co.–Brega	8,400	....	[1]1,000
Total	**329,400**	**....**	**13,982**

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
MADAGASCAR			
Solima–Managareza, Tamatave	16,350	....	[1]2,600
MALAYSIA			
Esso Malaysia Berhad–Port Dickson	47,300	....	[2]7,410
Petronas Penapisan Sdn. Berhad–Kerteh, Kemaman, Terengganu	30,000	....	....
Sarawak Shell Berhad–Luton	45,000	....	....
Shell Refining Co. Berhad–Port Dickson	90,000	....	[1]4,000 [1]10,000
Total	212,300	....	21,410
MARTINIQUE			
Ste. Anonyme de la Raffinerie des Antilles–Fort-de-France	12,800	....	[2]7,410
MEXICO			
Petroleos Mexicanos–Azcapotzalco	110,000	[1]24,000	....
Cadereyta	235,000	[1]40,000	[2]20,000
Ciudad Madero[1]	195,000	[1]43,000 [4]9,000	[2]15,000
Minatitlan	200,000	[1]24,000 [2]16,000	[2]48,000
Poza Rica	50,000	....	....
Reynosa	9,000	....	....
Salamanca	235,000	[1]40,000	[2]24,800
Salina Cruz	165,000	[1]40,000	[6]20,000
Tula, Hidalgo	155,000	[2]40,000	[2]30,000
Total	1,354,000	267,000	157,800
Solvent extraction: [1]38,000 b/cd.			
MOROCCO			
Samir–Mohammedia	129,000	....	[2]24,000
Ste. Cherifienne des Petroles–Sidi Kacem	25,600	[2]5,600	[1]2,800
Total	154,600	5,600	26,800
NETHERLANDS			
BP Raffinaderij Nederland NV–Rotterdam	437,000	[1]47,500	[2]27,000
Esso Nederland BV–Rotterdam	155,000	....	[4]25,200
Kuwait Petroleum Europoort BV–Rotterdam	75,500	....	[2]8,200
Shell Nederland Raffinaderij BV–Pernis	348,000	[3]6,400 [1]78,000	[2]17,000 [6]35,000
Smid & Hollander Raffinaderij BV–Amsterdam	8,500	....	....
Texaco Petroleum Mij. (Nederland) BV–Pernis	207,000	....	[2]29,000
Total Raffinaderij Nederland NV–Vlissingen	150,000	....	[2]16,000
Total	1,381,000	125,500	157,400
NETHERLANDS ANTILLES			
Refineria Isla Curazao SA–Emmastad	320,000	[1]42,000	[2]15,000
NEW ZEALAND			
New Zealand Refining–Whangarei	81,700	....	[2]21,700
NICARAGUA			
Esso Standard Oil SA Ltd.–Managua	14,500	....	[1]2,800

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
NIGERIA			
Nigerian Petroleum Refining CL–Kaduna[1]	110,000	[1]21,000	[1]17,000
Port Harcourt, Alesa Eleme	60,000	....	[1]6,000
Warri	100,000	[1]26,000	[2]16,700
Total	270,000	47,000	39,700
Solvent extraction: [1]9,492 b/cd.			
NORWAY			
Esso Norge AS–Slagen-Valloy	90,000	....	[2]9,150
Norske Shell AS–Sola	60,000	....	[2]10,000
Rafinor AS-Mongstad	90,000	....	[2]10,000
Total	240,000	....	29,150
OMAN			
Oman Refinery Co.–Mina Al Fahal	76,932	....	[2]15,386
PAKISTAN			
Attock Refinery Ltd.–Rawalpindi	36,000	....	....
National Refinery Ltd.–Korangi, Karachi	47,750	....	[2]2,750
Pakistan Refinery Ltd.–Karachi	46,300	....	[1]2,700
Total	130,050	....	5,450
PANAMA			
Refineria Panama SA–Las Minas	100,000	....	[2]7,500
PARAGUAY			
Petroleos Paraguayos–Villa Elisa	7,500	....	....
PERU			
Petróleos del Peru:			
Conchan	5,670	....	....
Iquitos, Loreto	9,450	....	....
La Pampilla, Lima	99,750	[1]6,365	[1]1,680
Marsella, Loreto	1,953	....	....
Pucallpa	2,565	....	....
Talara	62,630	[1]14,940	....
Total	182,018	21,305	1,680
PHILIPPINES			
Caltex (Philippines) Inc.–Batangas	63,000	[1]8,100	[2]8,100
Petron Corp.–Limay, Bataan	155,000	[2]15,000	[1]23,800
Philippine Petroleum Corp.–Pililla	....	....	....
Pilipinas Shell Petroleum–Tabangao	68,000	....	[1]8,300
Total	286,000	23,100	40,200
POLAND			
Government-owned refineries at Czechowice, Gdansk, Glinik Mariampolski, Jasto, Jealicze, Kralaty, L. Warynski, Plock, Trzebinia. Of these, Plock is by far the largest, accounting for roughly 80% of Polish refinery production. Its crude capacity is nearly 300,000 b/d.			
Total	385,000		
PORTUGAL			
Petrogal–Lisbon	....	[2]10,100	....
Leça da Palmeira, Porto	88,300	....	[5]10,500
Sines	206,000	....	[6]24,900
Total	294,300	10,100	35,400
PUERTO RICO			
Bayamón Refinery–Bayamón	38,000	[1]12,000	[2]5,800
Yabucoa Sun Oil Co.–Yabucoa	85,000	....	....
Total	123,000	12,000	5,800

WORLDWIDE REFINING	b/cd Crude capacity	b/cd Catalytic cracking	b/cd Cat reforming
QATAR			
National Oil Distribution Co.–			
Umm Said	62,000	....	[2]2,200
			[6]9,830
Total	**62,000**	....	**12,030**
ROMANIA			
Government-owned refineries at Bacau, Borzesti, Brazi, Brazov, Cimpina, Darmanesti, G. Gheorghiu Dej, Navodari, Onesti, Pitesti, Ploesti, Sulpacu, and Telaejen.			
Total	**617,000**		
SAUDI ARABIA			
Arabian American Oil Co.–			
Ras Tanura	450,000	....	[4]60,000
Arabian Oil CL–Ras Al Khafji	30,000	....	....
Jeddah Oil Refinery–Jeddah	91,000	[1]10,000	[2]2,900
Petromin-Mobil–Yanbu	250,000	[1]66,000	[6]32,000
Petromin-Sheli–Al-Jubail[1]	250,000	....	[6]15,000
Riyadh Oil Refinery–Riyadh[2]	134,000	....	[2]28,600
			[5]5,400
Yanbu Domestic Refinery–Yanbu	170,000	....	[2]35,000
Total	**1,375,000**	**76,000**	**178,900**
Solvent extraction: [1]12,500 b/cd. [2]8,800 b/cd.			
SENEGAL			
Ste. Africaine de Raffinage–			
M'Bao (Dakar)	**29,800**	....	[4]2,870
SIERRA LEONE			
Sierra Leone Petroleum Refining Co.–Freetown	**10,000**	....	....
SINGAPORE			
BP Refinery Singapore PL			
Pasir Panjang	28,000	....	....
Esso Singapore PL–Pulau Ayer			
Chawan	176,000	....	[2]8,600
Mobil Oil Singapore PL–Jurong	193,000	....	[2]14,000
Shell Eastern Petroleum Ltd.–			
Pulau Bukom	300,000	....	[2-6]20,700
Singapore Refinery CPL†–			
Pulau Merlimau	161,000	....	[4]11,000
Total	**858,000**	....	**54,300**
†Singapore Petroleum CPL shares percentages of refinery capacities.			
SOMALIA			
Iraqsoma Ref. Co.–Mogadishu	**10,000**	....	....
SOUTH AFRICA			
Caltex Oil SA PL–Cape Town	90,000	[1]25,000	[2]10,500
Mobil Oil Refining Co.–			
Southern Africa PL–Durban	65,000	[1]15,000	[2]15,000
†Durban	....	....	....
National Petroleum Refiners of			
South Africa PL–Sasolburg OFS	78,500	[1]17,400	[2]11,300
Shell and BP South Africa			
Petroleum Refineries PL–Durban	200,000	[1]27,000	[2]26,000
Total	**433,500**	**84,400**	**62,800**
†South African Oil Refinery PL is owner; Mobil is operator.			
SPAIN			
Asfaltos Españoles SA–Tarragona	21,000	....	....
Cia. Española de Petróles–San Roque			
(Cádiz)	160,000	[1]36,000	[2]35,000
Tenerife	130,000	....	[2]15,000
Petróleos del Mediterraneo–			
Castellón de la Plana	112,000	[1]14,000	[2]14,000
Petronor SA–Somorrostro, Vizcaya	240,000	[1]45,000	[2]33,500
Repsol Petroleo SA–Cartagena, Murcia	112,000	....	[2]25,000
La Coruña	135,000	[1]25,000	[2]18,500
		[5]13,500	
Puertollano, Ciudad Real	135,000	[1]23,500	[2]18,000
Tarragona	180,000	....	[2]16,000
Unión Explosivos Rio Tinto SA–			
La Rábida, Huelva	80,000	....	[2]14,100
Total	**1,305,000**	**143,500**	**189,100**
SRI LANKA			
Ceylon Petroleum Corp.–			
Sapugaskanda	**50,000**	....	[2]3,750
SUDAN			
Port Sudan Refinery Ltd.–Port Sudan	**21,440**	....	[1]1,700
SWEDEN			
AB Nynas Petroleum–Gothenburg	12,500	....	....
Nynäshamn	28,000	....	....
BP Raffinaderi–Gothenburg	106,000	....	[2]20,500
Shell Raffinaderi BV–Gothenburg	80,000	....	[2]16,000
Skandinaviska Raffinaderi AB–			
Brofjorden-Lysekil	210,000	[1]27,000	[4]36,200
Total	**436,500**	**27,000**	**72,700**
SWITZERLAND			
Raffinerie de Cressier SA–Cressier	60,000	....	[2]16,000
Raffinerie du Sud-Ouest SA–			
Collombey	72,000	....	[2]10,000
Total	**132,000**	....	**26,000**
SYRIA			
Banias Refining Co.–Banias	126,350	....	[3]16,728
Homs Refinery Co.–Homs	102,440	....	[3]2,620
Total	**228,790**	....	**19,348**
TANZANIA			
Tanzanian & Italian Petroleum			
Refining CL–Kigamboni, Dar es			
Salaam	**13,500**	....	[2]3,000
THAILAND			
Esso Standard Thailand Ltd.–Sriracha	63,000	....	[2]6,700
Petroleum Authority of Thailand–			
Bangchak, Bangkok	65,000	....	[2]10,500
Thai Oil CL–Sriracha	63,860	[1]9,250	[1]2,800
			[2]5,300
Total	**191,860**	**9,250**	**25,300**
TOGO			
Ste. Togolaise des Hydrocarbures–			
Lome	**20,000**	....	[4]4,400
TRINIDAD			
Trinidad and Tobago Oil CL–			
Pointe-a-Pierre	220,000	[1]25,000	[4]25,000
Point Fortin	80,000	....	[5]6,000
Total	**300,000**	**25,000**	**31,000**
TUNISIA			
Ste. Tunisienne Industries			
des Raffinage–Bizerte	**34,000**	....	**3,300**
TURKEY			
Anadolu Tasfiyehanesi AS–Mersin	90,000	....	[2]10,500
Turkish Petroleum Refineries Corp.:			
Aliaga-Izmir[1]	204,000	[1]14,000	[2]9,800
Batman, Siirt	20,000	....	[1]1,300
Izmit	248,455	[1]20,100	[2]23,430
Kirikkale	113,140	....	[1]20,340
Total	**575,595**	**34,100**	**65,370**
Solvent extraction: [1]10,273 b/cd (furfural), 6,038 b/cd (propane deasphalting).			

WORLDWIDE REFINING	b/cd Crude capacity	Catalytic cracking	Cat reforming
UNITED KINGDOM			
England			
Conoco Ltd.–South Killingholme	130,000	[1]38,000	[2]60,000
Esso Petroleum CL–Fawley	300,200	[1]76,500	[2]27,900
Lindsey Oil Refinery Ltd.–Killingholm, South Humberside	190,000	[1]40,000	[2]33,600
Mobil Oil CL–Coryton, Essex	145,000	[1]47,000	[2]27,000
Phillips Imperial Petroleum Ltd.–Port Clarence	100,000	....	....
Philmac Oils Ltd.–Eastham, Cheshire	12,000	....	....
Shell U.K. Ltd.–Shell Haven	92,000	....	[6]34,006
Stanlow	262,000	[1]54,000	[1]29,000 [5]27,000
Total	**1,231,200**	**255,500**	**261,000**
Scotland			
BP Refinery Grangemouth Ltd.–Grangemouth	178,500	[1]19,000	[2]32,000
William Briggs & Sons Ltd.—Dundee	6,000	....	....
Total	**184,500**	**19,000**	**32,000**
Wales			
Amoco UK Ltd.–Milford Haven	102,000	[1]31,500	[6]17,500
BP Refinery Llandarcy Ltd.–Llandarcy, Neath	....	....	....
Gulf Oil-GB–Milford Haven	105,000	....	[2]18,000
Pembroke Cracking Co. (65% Texaco, 35% Gulf Oil-GB)	....	[1]86,000	....
Texaco Ltd.–Pembroke, Dyfed	180,000	....	[6]39,000
Total	**387,000**	**117,500**	**74,500**
Total United Kingdom	**1,802,700**	**392,000**	**367,500**
URUGUAY			
Ancap–La Teja, Montevideo	**45,000**	[1]**5,000**	[1]**3,000**
U.S.S.R.			
Government-owned refineries at Achinsk, Angarsk, Baku, Batumi, Chimkent, Drogobych, Fergana, Gorki, Grozny, Guryev, Ishimbai, Khabarovsk, Kherson, Kirishi, Komsomolsk, Krasnovodsk, Kremenchug, Kuibyshev, Lisichansk, Mazheikiai, Moscow, Mozyr, Nadvornaya, Nizhnekamsk, Odessa, Omsk, Orsk, Pavlodar, Perm, Polotsk, Ryazan, Saratov, Syzran, Tuapse, Ufa, Ukhta, Vannovskiy, Volgograd, and Yaroslavl.			
Total	**12,260,000**		
VENEZUELA			
Corpoven–El Palito, Carabobo	105,000	[1]45,000	[1]6,000
El Toreño, Barinas	4,500	....	....
Puerto La Cruz, Anzoategui	195,100	[1]11,400	....
San Roque, Anzoategui	5,200	....	....
Lagoven–Judibana, Falcon	600,000	[1]76,100	....
Maraven–Punta Cardon, Falcon	291,300	[1]60,600	....
Total	**1,201,100**	**193,100**	**6,000**
VIRGIN ISLANDS			
Hess Oil Virgin Islands Corp.–St. Croix	**545,000**	....	[2]**125,000**
YEMEN, N.			
Yemen Hunt Oil Co.–Marib	**10,000**	....	[1]**2,500**
YEMEN, S.			
Aden Refinery Co.–Little Aden	**170,000**	....	[1]**12,000**
YUGOSLAVIA			
Bosanski Brod[1]	112,835	....	[2]7,612 [6]13,500
Lendava	18,100	....	....
Novi Sad	58,000	....	[2]8,200
Pančevo	108,000	[1]20,750	[2]8,800
Rijeka	160,000	[1]21,300	[2]17,500
Sisak	150,000	[1]10,000	[2]19,000
Zagreb	700	....	....
Total	**607,635**	**52,050**	**74,612**
Solvent extraction: [1]3,300 b/cd (deasphalting).			
ZAIRE			
Sozir–Muanda	**17,000**	....	[2]**3,000**
ZAMBIA			
Indeni Petroleum Refinery CL–Bwana Mkubwa Area, Ndola	**23,750**	[2]**5,040**	[2]**5,040**

UNITED STATES

Survey of operating refineries in the U.S. (state capacities as of January 1, 1988)

State	No. plants	Crude capacity b/cd	Cat cracking Fresh feed	Cat reforming
Alabama	2	124,500	.....	27,000
Alaska	6	225,000	.....	12,000
Arizona	1	5,700	.....	.....
Arkansas	3	58,570	18,500	9,000
California	28	2,317,793	628,000	533,300
Colorado	2	76,500	23,500	17,500
Delaware	1	140,000	65,000	56,000
Georgia	2	34,500	.....	.....
Hawaii	2	116,000	22,000	12,000
Illinois	6	920,600	339,000	294,300
Indiana	4	424,600	167,000	99,000
Kansas	7	352,600	125,000	89,600
Kentucky	2	218,900	100,000	53,500
Louisiana	17	2,273,015	824,000	499,300
Michigan	4	120,100	45,000	31,500
Minnesota	2	222,143	78,000	49,500
Mississippi	5	358,600	74,000	95,800
Montana	4	137,200	50,600	35,500
Nevada	1	4,500	.....	.....
New Jersey	6	435,650	256,000	77,500
New Mexico	3	72,800	27,200	16,600
North Dakota	1	58,000	26,000	12,100
Ohio	4	482,650	176,000	156,000
Oklahoma	6	387,000	134,500	90,000
Oregon	1	15,000	.....	.....
Pennsylvania	8	727,200	259,300	208,820
Tennessee	1	57,000	30,000	10,000
Texas	31	4,090,800	1,608,500	1,129,400
Utah	6	154,500	55,800	29,100
Virginia	1	51,000	27,500	9,500
Washington	7	458,175	100,000	119,800
West Virginia	1	10,500	.....	3,400
Wisconsin	1	32,000	9,700	8,000
Wyoming	6	165,300	63,000	32,350
Total	**182**	**15,327,746**	**5,333,100**	**3,817,370**

U.S. refineries

Company and refinery location	Crude	Catalytic cracking	Catalytic reforming
ALABAMA			
Hunt Refining Co.—Tuscaloosa	44,500	.....	[2]6,000
Louisiana Land & Exploration Co.—Saraland	80,000	.....	[2]21,000
Total	**124,500**	**.....**	**27,000**
ALASKA			
Arco Alaska Inc.—Kuparuk	12,000	.....	.....
Prudhoe Bay	22,000	.....	.....
Chevron U.S.A. Inc.—Kenai	22,000	.....	.....
Mapco Petroleum Inc.—North Pole	90,000	.....	.....
Petro Star Inc.—North Pole	7,000	.....	.....
Tesoro Petroleum Corp.—Kenai	72,000	.....	[4]12,000
Total	**225,000**	**.....**	**12,000**
ARIZONA			
Intermountain Refining Cl—Fredonia	**5,700**	**.....**	**.....**
ARKANSAS			
Berry Petroleum Co.—Stevens	3,800	.....	.....
Cross Oil & Refining Co. of Arkansas—Smackover	6,770	.....	.....
Lion Oil Co.—El Dorado[1]	48,000	[1]18,500	[2]9,000
Total	**58,570**	**18,500**	**9,000**
Solvent extraction: [1]5,500 b/d.			
CALIFORNIA			
Anchor Refining Cl—McKittrick	10,000	.....	.....
Atlantic Richfield Co.—Carson	214,000	[1]77,000	[2]48,000
Chevron U.S.A. Inc.—El Segundo	405,000	[1]60,000	[2]60,000
Richmond[1]	350,000	[1]63,000	[2]68,000
Conoco Inc.—Santa Maria	9,500	.....	.....
Edgington Oil Cl—Long Beach	41,600	.....	.....
Exxon Co.—Benicia	126,000	[1]64,000	[3]28,000
Fletcher Oil & Refining Co.—Carson	29,500	[1]10,500	[4]5,000
Golden Bear Division, Witco Chemical Corp.—Oildale	10,818	.....	.....
Golden West Refining Co.—Santa Fe Springs	40,600	[1]13,500	[2]19,000
Huntway Refining Co.—Benicia	8,400	.....	.....
Wilmington	5,500	.....	.....
Kern Oil & Refining Co.—Bakersfield	20,000	.....	[2]3,000
Lunday-Thagard Co.—South Gate	8,100	.....	.....
Mobil Oil Corp.—Torrance	123,000	[1]63,000	[2]36,000
Newhall Refining Cl—Newhall	21,400	.....	[3]2,300
Oxnard Refinery—Oxnard	NR	.....	.....
Pacific Refining Co.—Hercules	55,000	.....	[2]15,000
San Joaquin Refining Cl—Bakersfield	18,000	.....	.....
Shell Oil Co.—Martinez	140,100	[1]67,000	[3]28,000
Wilmington	129,000	[1]42,000	[2]24,000
Sunland Refining Corp.—South Gate	15,000	.....	[2]1,500
Texaco Refining & Marketing Inc.— Bakersfield	41,000	.....	[2]23,000
Wilmington	75,000	[1]28,000	[2]35,000
Tosco Corp.—Martinez	126,000	[1]55,000	[2]20,000 [6]23,000
Union Pacific Resources—Wilmington	65,000	[1]38,000	[6]14,500
Unocal Corp.—Los Angeles	108,000	[1]47,000	[2]52,000
Rodeo	118,000	.....	[2]28,000
Total	**2,317,793**	**628,000**	**533,300**
Solvent extraction: [1]50,000 b/sd.			
COLORADO			
Colorado Refining Co.—Commerce City	33,500	[1]8,500	[2]10,000
Conoco Inc.—Commerce City	43,000	[1]15,000	[2]7,500
Total	**76,500**	**23,500**	**17,500**

Company and refinery location	Crude	Catalytic cracking	Catalytic reforming
DELAWARE			
Texaco Refining and Marketing Inc.—Delaware City	140,000	[1]65,000	[2]18,000 [5]38,000
Total	**140,000**	**65,000**	**56,000**
GEORGIA			
Amoco Oil Co.—Savannah	28,000	.....	.....
Young Refining Corp.—Douglasville	6,500	.....	.....
Total	**34,500**	.....	.....
HAWAII			
Chevron U.S.A. Inc.—Barber's Point	48,000	[1]22,000	.....
Hawaiian Independent Refinery Inc.—Ewa Beach	68,000	.....	[2]12,000
Total	**116,000**	**22,000**	**12,000**
ILLINOIS			
Clark Oil & Refining Corp.—Blue Island	64,600	[1]25,000	[2]30,500
Hartford	60,000	[1]26,000	[2]12,000
Marathon Petroleum Co.—Robinson	195,000	[1]38,000	[4]38,000 [5]41,000
Mobil Oil Corp.—Joliet	180,000	[1]98,000	[2]46,000
Shell Oil Co.—Wood River	274,000	[1]94,000	[2]22,000 [3]75,000
Unocal Corp.—Lemont	147,000	[1]58,000	[2]29,800
Total	**920,600**	**339,000**	**294,300**
INDIANA			
Amoco Oil Co.—Whiting	350,000	[1]140,000	[3]85,000
Indiana Farm Bureau Cooperative Association Inc.—Mt. Vernon	20,600	[1]7,000	[2]4,000
Laketon Refining Corp.—Laketon	8,300	.....	.....
Rock Island Refining Corp.—Indianapolis[1]	45,700	[1]20,000	[2]10,000
Total	**424,600**	**167,000**	**99,000**

Solvent extraction: [1]4,500.

KANSAS			
Derby Refining Co.—El Dorado[1]	29,500	[1]14,500	[2]5,000
Wichita	29,500	[1]17,000	[2]7,000
Farmland Industries Inc.—Coffeyville	56,500	[1]23,000	[2]16,000
Phillipsburg	26,400	.....	[2]5,300
National Cooperative Refinery Association—McPherson	75,600	[1]20,000	[2]15,000
Texaco Refining & Marketing Inc.—El Dorado	81,500	[1]31,500	[2]25,000
Total Petroleum Inc.—Arkansas City	53,600	[1]19,000	[2]16,300
Total	**352,600**	**125,000**	**89,600**

Solvent extraction: [1]5,600 b/sd.

KENTUCKY			
Ashland Petroleum Co.—Catlettsburg	213,400	[1]60,000 §40,000	[2]25,500
Somerset Refinery Inc.—Somerset	5,500	.....	[2]1,000
Total	**218,900**	**100,000**	**53,500**

§Reduced crude converter.

LOUISIANA			
Atlas Processing Co., Division of Pennzoil—Shreveport	46,200	.....	[2]10,000
Calcasieu Refining Co.—Lake Charles	12,000	.....	.....
Calumet Refining Co.—Princeton	4,100	.....	.....
Canal Refining Co.—Church Point	9,865	.....	[1]1,900
Citgo Petroleum Corp.—Lake Charles	320,000	[1]150,000	[2]46,000 [5]45,000
Conoco Inc.—Westlake	156,500	[1]38,000	[2]15,900 [5]11,500
Cotton Valley Refinery (Kerr-McGee Refining Corp.)—Cotton Valley	7,800	.....	.....
Exxon Co.—Baton Rouge[1]	455,000	[1]155,000	[4]95,000
Hill Petroleum Co.—Krotz Springs	55,300	[1]28,000	[2]12,500
St. Rose	33,000	.....	.....
Marathon Petroleum Co.—Garyville	255,000	[1]85,000	[5]48,000
Murphy Oil USA Inc.—Meraux[2]	92,500	[1]35,000	[5]23,000
Placid Refining Co.—Port Allen[3]	46,000	[1]18,000	[2]10,000
Shell Oil Co.—Norco	215,000	[1]90,000	[2]18,000 [3]38,000
Sohio Oil Co.(BP America)—Belle Chasse	NR	[1]89,000	[2]37,500
Tenneco Oil Co.—Chalmette	145,000	[1]51,000	[2]28,000 [5]19,000
Texaco Refining & Marketing Inc.—Convent	225,000	[1]85,000	[2]40,000
Total	**2,273,015**	**824,000**	**499,300**

Solvent extraction: [1]28,500 b/sd. [2]12,000 b/sd. [3]5,000 b/sd.

MICHIGAN			
Crystal Refining Co.—Carson City	4,000	.....	.....
Lakeside Refining Co.—Kalamazoo	5,600	.....	[1]1,000
Marathon Petroleum Co.—Detroit	68,500	[1]27,000	[2]18,500
Total Petroleum Inc.—Alma	42,000	[1]18,000	[2]12,000
Total	**120,100**	**45,000**	**31,500**
MINNESOTA			
Ashland Petroleum Co.—St. Paul Park	67,143	[1]23,000	[2]23,500
Koch Refining Co.—Rosemount	155,000	[1]55,000	[6]26,000
Total	**222,143**	**78,000**	**49,500**
MISSISSIPPI			
Amerada-Hess Corp.—Purvis	30,000	[2]18,000	[2]5,800
Chevron U.S.A. Inc.—Pascagoula	295,000	[1]56,000	[2]90,000
Ergon Refining Inc.—Vicksburg	16,800	.....	.....
Southland Oil Co.—Lumberton	5,800	.....	.....
Sandersville	11,000	.....	.....
Total	**358,600**	**74,000**	**95,800**
MONTANA			
Cenex—Laurel[1]	40,400	[1]12,000	[2]12,000
Conoco Inc.—Billings[2]	48,500	[1]15,500	[2]12,500
Exxon Co.—Billings	42,000	[1]21,000	[1]10,000
Montana Refining Co.—Great Falls	6,300	[1]2,100	[2]1,000
Total	**137,200**	**50,600**	**35,500**

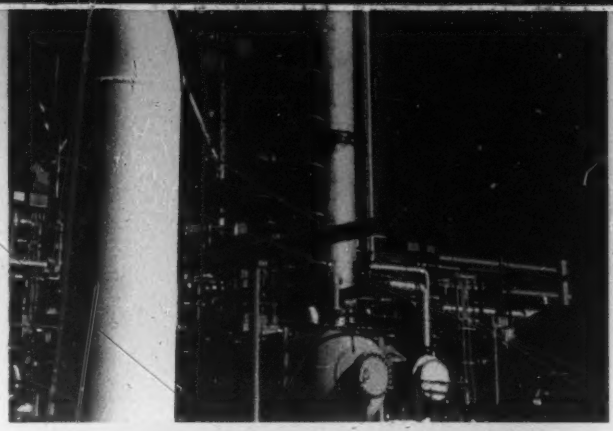
Solvent extraction: [1]4,000 b/sd. [2]8,500 b/sd (PDA).

NEVADA			
Nevada Refining Co.—Tonopah	**4,500**	.....	.....
NEW JERSEY			
Amerada-Hess Corp.—Port Reading	.....	[1]55,000	.....
Chevron U.S.A. Inc.—Perth Amboy	80,000	.....	.....
Coastal Eagle Point Oil Co.—Westville	90,000	[1]45,000	[2]26,000
Exxon Co.—Linden	120,000	[1]120,000	[4]28,000
Mobil Oil Corp.—Paulsboro[1]	100,000	[1]36,000	[2]23,500
Seaview Petroleum Inc.—Thorofare	45,000	.....	.....
Total	**435,000**	**256,000**	**77,500**

Solvent extraction: [1]9,500 b/sd.

NEW MEXICO			
Bloomfield Refining Co.—Bloomfield	16,800	[1]5,400	[2]2,800
Giant Industries Inc.—Gallup	18,000	[1]7,300	[2]6,000
Navajo Refining Co.—Artesia	NR	[1]14,500	[1]1,800 [2]6,000
Total	**72,800**	**27,200**	**16,600**
NORTH DAKOTA			
Amoco Oil Co.—Mandan	**58,000**	[1]26,000	[4]12,100

Company and refinery location	Crude	Catalytic cracking	Catalytic reforming
OHIO			
Ashland Petroleum Co.—Canton	66,000	[1]25,000	[5]20,000
Sohio Oil Co. (BP America)—Lima	NR	[1]36,000	[4]53,000
Toledo	NR	[1]55,000	[3]23,000
			[4]19,000
Sun CI-Toledo[1]	125,000	[1]60,000	[2]41,000
Total	**482,650**	**176,000**	**156,000**
Solvent extraction: [1]11,000 b/sd.			
OKLAHOMA			
Barrett Refining Corp.—Thomas	13,000	.....	.....
Conoco Inc.—Ponca City	134,000	[1]46,000	[2]34,500
Kerr-McGee Refining Corp.—Wynnewood[1]	43,000	[1]20,000	[2]8,500
Sinclair Oil Corp.—Tulsa	50,000	[1]18,000	[2]12,000
Sun CI—Tulsa[2]	85,000	[1]28,000	[2]23,000
Total Petroleum Inc.—Ardmore	62,000	[1]22,500	[4]12,000
Total	**387,000**	**134,500**	**90,000**
Solvent extraction: [1]5,000 b/sd. [2]5,900 b/sd.			
OREGON			
Chevron U.S.A. Inc.—Portland	**15,000**	.....	.....
PENNSYLVANIA			
Atlantic Refining & Marketing Corp.—Philadelphia	125,000	[1]29,000	[2]60,000
Chevron U.S.A. Inc.—Philadelphia	174,100	[1]73,300	[2]34,000
Kendall-Amalie Division, Witco Chemical Co.—Bradford	9,900	.....	[2]3,400
Pennzoil Products Co.—Rouseville	15,700	.....	[2]5,820
Quaker State Oil Refining Corp.—Smethport[1]	6,500	.....	[2]2,000
Sohio Oil Co. (BP America)—Marcus Hook	NR	[1]50,000	[6]48,000
Sun CI—Marcus Hook	165,000	[1]87,000	[2]39,600
United Refining Co.—Warren	60,000	[1]20,000	[2]16,000
Total	**727,200**	**259,300**	**208,820**
Solvent extraction: [1]730 b/sd.			
TENNESSEE			
Mapco Petroleum Inc.—Memphis	NR	[1]30,000	[2]10,000
Total	**57,000**	**30,000**	**10,000**
TEXAS			
Amoco Oil Co.—Texas City	400,000	[1]194,000	[4]160,000
Champlin Refining Co.—Corpus Christi[1]	150,000	[1]70,000	[1]54,000
Chevron U.S.A. Inc.—El Paso	76,000	[1]22,000	[2]25,000
Port Arthur	406,900	[1]110,000	[2]23,000
			[4]44,100
Coastal Refining & Marketing Inc.—Corpus Christi	90,000	[1]18,500	[1]11,000
			[5]18,000
Crown Central Petroleum Corp.—Houston	100,000	[1]56,000	[2]14,000
			[5]22,000
Diamond Shamrock Corp.—Sunray[2]	100,000	[1]45,000	[2]29,000
Three Rivers[3]	45,000	[1]19,000	[2]11,000
El Paso Refining CL—El Paso	21,000	[1]7,000	[2]5,600
Exxon Co. U.S.A.—Baytown[4]	493,000	[1]155,000	[3]60,000
			[4]63,000
Fina Oil & Chemical Co.—Big Spring[5]	55,000	[1]22,000	[2]20,000
Port Arthur[6]	90,000	[1]34,000	[5]30,000
Hill Petroleum Co.—Houston[7]	67,500	[1]50,000	[2]13,500
Howell Hydrocarbons Inc.—San Antonio	5,000	.....	[1]1,000
Koch Refining Co.—Corpus Christi	125,000	[1]40,000	[1]12,000
			[3]15,000
LaGloria Oil & Gas Co.—Tyler	49,500	[1]17,000	[2]4,500
			[5]11,700
Liquid Energy Corp.—Bridgeport	10,000	.....	.....
Lyondell Petrochemical Co.—Houston[8]	255,000	[1]90,000	[1]108,000
Marathon Petroleum Co.—Texas City	69,500	[1]38,000	[1]9,000
Mobil Oil Corp.—Beaumont	275,000	[1]102,000	[2]103,000
Phillips 66 Co.—Borger	105,000	[1]60,000	[2]26,000
Sweeny	175,000	[1]87,000	[2]36,000
Pride Refining Inc.—Abilene	42,750	.....	.....
Shell Oil Co.—Deer Park	214,000	[1]65,000	[2]20,000
			[3]44,000
Odessa	28,600	[1]10,500	[1]11,000
Southwestern Refining CI—Corpus Christi	104,000	[1]50,000	[2]30,000



Company and refinery location	Crude	Catalytic cracking	Catalytic reforming
Texaco Refining & Marketing Inc.—Port Arthur and Port Neches[9]	250,000	[1]110,000	[5]40,000
Texas City Refining Inc.—Texas City	119,600	[1]43,500	[2]11,000
			[5]12,000
Trifinery—Corpus Christi	28,500	.....	.....
Unocal Corp.—(Beaumnont), Nederland	120,000	[1]39,000	[3]12,000
			[4]20,000
Valero Refining Co.—Corpus Christi	NR	†54,000	.....
Total	**4,090,800**	**1,608,500**	**1,129,400**
Solvent extraction: [1]12,000 b/sd. [2]15,000 b/sd. [3]7,000 b/sd. [4]53,000 b/sd. [5]10,000 b/sd. [6]18,000 b/sd. [7]11,000 b/sd. [8]10,200 b/sd. [9]4,000 b/sd. †Heavy oil cracker.			
UTAH			
Amoco Oil Co.—Salt Lake City	40,000	[1]18,000	[4]7,600
Big West Oil Co.—Salt Lake City	24,000	[2]5,400	[2]5,000
Chevron U.S.A.—Salt Lake City	45,000	[1]11,000	[2]5,500
		[2]7,000	
Crysen Refining Inc.—Woods Cross	12,500	.....	[2]3,000
Pennzoil Products Co.—Roosevelt	8,000	[1]6,000	[2]2,000
Phillips 66 Co.—Woods Cross[1]	25,000	[2]8,400	[2]6,000
Total	**154,500**	**55,800**	**29,100**
Solvent extraction: [1]5,000 b/sd.			
VIRGINIA			
Amoco Oil Co.—Yorktown	**51,000**	[1]27,500	[2]9,500
WASHINGTON			
Atlantic Richfield Co.—Ferndale	162,000	.....	[2]56,000
Chevron U.S.A. Inc.—Seattle	5,500	.....	.....
Mobil Oil Corp.—Ferndale	77,000	[2]25,500	[4]11,800
Shell Oil Co.—Anacortes	82,000	[1]39,500	[3]25,000
Sound Refining Inc.—Tacoma	11,900	.....	.....
Texaco Refining & Marketing Inc.—Anacortes[1]	87,000	[1]35,000	[2]21,000
U.S. Oil & Refining Co.—Tacoma	NR	.....	[2]6,000
Total	**458,175**	**100,000**	**119,800**
Solvent extraction: [1]5,000 b/sd.			
WEST VIRGINIA			
Quaker State Oil Refining Corp.—Newell	**10,500**	.....	[2]3,400
WISCONSIN			
Murphy Oil USA Inc.—Superior	**32,000**	[1]9,700	[2]8,000
WYOMING			
Amoco Oil Co.—Casper	40,000	[1]13,500	[4]6,500
Frontier Oil & Refining Co.—Cheyenne	35,000	[1]12,000	[2]7,000
Little America Refining Co.—Casper	24,500	[1]12,500	[2]6,100
Mountaineer Refining CI—LaBarge	300	.....	.....
Sinclair Oil Corp.—Sinclair	53,000	[1]21,000	[1]10,000
Wyoming Refining Co.—Newcastle	12,500	[2]4,000	[1]2,750
Total	**165,300**	**63,000**	**32,350**

Selected giant gas fields of the world

State, province, field, date discovery	Est. 1986 production bcf	Est. reserves bcf	Cum. prod. 1-1-87 bcf	Remaining reserves
Alaska				
Kenai, 1959	130	2,460	1,700	760
Prudhoe Bay, 1967	980	25,944	5,472	20,472
Ark.-La.-Tex.				
Rodessa, 1930	7	3,200	807	2,453
California				
Kettleman-N. Dome, 1928	14	3,000	2,714	286
Rio Vista	10	3,500	3,465	35
Kan-Okla.-Tex.				
Hugoton, 1918	370	72,000	44,170	28,570
Oklahoma	55	—	—	—
Kansas only	268	—	18,695	—
Texas	47.3	—	—	—
Louisiana				
Bastian Bay, 1941	30	3,600	2,298	1,302
Bateman Lake, 1937	80	3,000	2,476	524
Bayou Sale, 1940	15	3,600	1,627	1,976
Monroe, 1916	40	9,400	7,284	2,116
Gibson, 1937	5	2,000	1,049	951
Hollywood, 1953	5	3,000	1,146	1,854
Houma, 1945	8	2,000	862	1,138
Lake Palourde, E., 1954	2	2,000	678	1,322
Breton Sound 30, 1972	30	4,000	2,179	1,821
W. Delta 27, 1941	10	2,000	1,610	390
Pecan Island, 1943	50	3,000	1,527	1,473
Garden City, 1957	20	2,000	1,585	415
Lake Raccourci, 1949	10	2,000	1,010	990
Lirette, 1937	10	2,000	1,276	724
Belle Isle, 1941	5	2,000	946	1,054
Duck Lake, 1949	1	2,000	1,042	958
Erath, 1940	5	5,052	1,244	3,808
Lake Arthur, 1937	20	2,500	2,109	391
Mississippi				
Gwinville, 1944	4	1,400	1,214	186
New Mexico				
Eunice-Jalmat et. al.	200	9,800	7,200	2,900
San Juan Basin, 1927	800	15,000	9,400	5,600
Oklahoma				
Mocane Laverne, 1952	100	3,800	1,800	2,000
Texas				
Carthage, 1936	80	7,600	5,780	1,820
Katy, 1935	120	6,000	920	5,080
Old Ocean, 1934	20	5,000	3,243	1,757
Gomez, 1963	50	10,000	3,850	6,150
Puckett, 1952	20	6,500	2,820	3,680
Wyoming				
Big Piney, 1938	1	2,800	851	1,949
Afghanistan				
Hodja Gugerdag	102	3,500	1,802	1,698
Algeria				
Hassi R'Mel, 1956	—	120,000	—	—
Rhourde Nuss, 1962	—	54,000	—	—
Australia				
Kingfish, 1967	5	3,000	255	2,745
Marlin, 1966	2	3,500	1,650	1,850
Gidgealpa, 1964	70	5,400	—	—
Moomba, 1964	240	5,400	—	—
Palm Valley	30	6,000	—	—
Rankin, N., 1971	—	4,000	—	—
China				
Ying Gehai	—	3,500	—	3,500
Canada				
Crossfield, 1952	4,800	—		
Pembina, 1953	—	4,800	—	—
Taglu, 1971	—	3,000	—	—
France				
Lacq, 1951	275	8,800	5,924	2,876
Ireland				
Kinsale Head	84	1,353	—	—
Mexico				
Poza Rica, 1930		6,000		
Reynosa, 1948	1,314	3,700		
José Colomo, 1951		4,900		
Netherlands				
Groningen, 1959	1,788	58,200	19,788	38,412
Norway				
Ekofisk, 1969		3,300	—	—
Frigg, 1972	985	10,000	—	—
Statfjord		3,100	—	—
Pakistan				
Sui, 1952	368	14,000	—	—
United Kingdom				
Hewett, 1966		4,200	—	—
Indefatigable, 1966		9,000	—	—
Leman Bank, 1966	1,449.5	12,000	—	—
Viking, 1969		5,000	—	—
U.S.S.R.				
Astrakhanskoye, 1977	10	17,650	10	17,640
Bovanenkovskoye, 1971	—	146,530	—	146,530
Gazli, 1956	380	17,718	12,380	5,338
Kharasavei, 1974	—	44,665	—	44,665
Kruzenshtern, 1976	—	39,550	—	39,550
Medvezhye	1,500	54,649	21,500	33,149
Orenburgskoye, 1966	1,600	62,826	17,900	44,926
Severo-Urengoi, 1970	—	30,279	—	30,279
Shatlyk, 1968	900	22,000	11,900	10,100
Shebelinka, 1950	80	18,638	18,080	558
Shurtan, 1974	140	19,330	180	19,150
Sovetabad, 1974	700	35,300	1,500	33,800
Urengoi, 1966	10,500	265,600	42,100	243,500
Vuktyiskoye, 1964	650	17,072	10,310	6,762
Yamburg, 1969	25	167,900	25	167,875
Yuzhno-Russkoye, 1969	—	26,506	—	26,506
Zapadno-Tarkosalinskoye, 1972	—	20,582	—	20,582
Zapolyarnoye, 1965	—	94,272	—	94,272

Worldwide production statistics

NORTH AMERICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987
Canada	23.5	79.6	525.6	801.4	1,263.6	1,496.0	1,412.0	1,287.0	1,233.0	1,396.0	1,430.0	1,453.0	1,475.3	1,508.3
	1.2	4.0	26.2	39.9	62.9	74.5	70.3	64.1	61.4	69.5	71.2	72.4	73.5	75.1
United States	3,707.4	5,407.1	7,054.6	7,804.1	9,630.0	8,544.0	8,569.0	8,568.0	8,655.0	8,669.0	8,750.0	8,919.0	8,790.0	8,276.7
	184.6	269.3	351.3	388.6	479.6	425.5	426.7	427.7	431.0	431.7	435.8	444.2	437.7	412.2
Total	3,730.9	5,486.7	7,580.2	8,605.5	10,893.6	10,040.0	9,981.0	9,875.0	9,888.0	10,065.0	10,180.0	10,372.0	10,265.3	9,785.0
	185.8	273.3	377.5	428.5	542.5	500.0	497.0	491.8	492.4	501.2	507.0	516.6	511.2	487.3

MIDDLE EAST

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987
Abu Dhabi	...	...	...	281.9	693.8	1,464.0	1,350.0	1,145.0	883.0	757.0	750.0	705.1	949.0	969.4
	...	...	...	14.0	34.6	72.9	67.2	57.0	44.0	37.7	37.4	35.1	47.3	48.3
Bahrain	19.3	30.2	45.1	57.0	76.6	51.0	48.0	44.0	45.0	41.0	41.0	41.9	44.0	43.2
	1.0	1.5	2.2	2.8	3.8	2.5	2.4	2.2	2.2	2.0	2.0	2.1	2.2	2.2
Dubai	...	...	...	...		354.0	349.0	358.0	357.0	327.0	324.0	348.0	350.0	381.2
	...	...	...	...	...	17.6	17.4	17.8	17.8	16.3	16.1	17.3	17.4	19.0
Iran	181.2	664.3	1,067.4	1,885.5	3,328.8	3,101.0	1,467.0	1,375.0	1,896.0	2,606.0	2,166.0	2,279.0	1,806.3	2,341.7
	9.0	33.1	53.2	93.9	165.8	154.4	73.1	68.5	94.4	129.8	107.9	113.5	90.0	116.6
Iraq	60.7	136	1,004.2	1,315.2	1,548.6	3,434.0	2,638.0	892.0	914.0	905.0	1,218.0	1,396.8	1,787.7	2,095.8
	3.0	6.8	50.0	65.5	77.1	171.0	131.4	44.4	45.5	45.1	60.7	69.6	89.0	104.4
Israel	...	...	2.5	4.0	70.2	31.0	1.0	0.3	0.3	0.2	0.1	0.1	0.1	1.0
	...	...	0.1	0.2	3.5	1.5	...	...	...	...	...	...	...	...
Jordan	...	...	...	...	...	...	...	...	...	...	...	...	...	4.0
	...	...	...	...	...	...	...	...	...	...	...	...	...	0.2
Kuwait	...	344.4	1,628.2	2,169.5	2,734.5	2,213.0	1,382.0	916.0	675.0	912.0	925.0	823.3	1,202.0	1,095.8
	...	17.2	81.1	108.0	136.2	110.2	68.8	45.6	33.6	45.4	46.1	41.0	59.9	54.6
Neutral Zone	...	...	136.2	360.9	500.6	567.0	540.0	370.0	315.0	398.0	420.0	357.8	325.7	399.2
	...	...	6.8	18.0	24.9	28.2	26.9	18.4	15.7	19.8	20.9	17.8	16.2	19.9
Oman	...	...	...	...	332.4	295.0	283.0	317.0	328.0	378.0	404.0	484.3	540.8	565.0
	...	...	...	...	16.6	14.7	14.1	15.8	16.3	18.8	20.1	24.1	26.9	28.1
Qatar	...	33.6	175.1	231.1	362.4	504.0	472.0	414.0	340.0	270.0	395.0	297.0	332.3	284.4
	...	1.7	8.7	11.5	18.0	25.1	23.5	20.6	16.9	13.4	19.7	14.8	16.5	14.2
Ras Al Khaimah	...	...	...	...	...	...	...	...	...	...	5.8	9.1	11.0	10.0
	...	...	...	...	...	...	...	...	...	...	0.3	0.5	0.5	0.5
Saudi Arabia	13.9	546.7	1,247.1	2,024.9	3,548.9	9,251.0	9,630.0	9,642.0	6,484.0	4,872.0	4,545.0	3,295.3	4,719.7	4,054.2
	0.7	27.2	62.1	100.8	176.7	460.7	479.6	480.2	322.9	242.6	226.3	164.1	235.0	201.9
Sharjah	...	...	...	...	...	13.0	10.0	9.0	7.0	35.0	62.0	66.1	65.0	66.9
	...	...	...	...	...	0.6	0.5	0.4	0.3	1.7	3.1	3.3	3.2	3.3
Syria	...	...	...	...	83.1	163.0	165.0	166.0	175.0	165.0	161.0	161.7	185.0	231.7
	...	...	...	...	4.1	8.1	8.2	8.3	8.7	8.2	8.0	8.1	9.2	11.5
Turkey	...	0.3	7.0	29.7	67.9	56.0	44.0	46.0	45.0	45.0	41.0	41.5	46.8	52.0
	...	...	0.3	1.5	3.4	2.8	2.2	2.3	2.2	2.2	2.0	2.1	2.3	2.6
Yemen, North	...	...	...	...	...	...	...	...	...	...	...	...	10.0	10.0
	...	...	...	...	...	...	...	...	...	...	...	...	0.5	0.5
Total	273.1	1,755.7	5,313.0	8,353.7	13,347.8	21,487.0	18,378.0	15,894.3	12,494.3	11,711.2	11,457.9	10,307.0	12,378.4	12,805.5
	13.7	87.5	264.5	416.2	664.7	1,070.3	915.3	791.5	620.5	583.0	570.6	513.4	616.1	627.8

*Totals may not add due to rounding.

EUROPE

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987
Austria	7.7	27.9	45.4	53.1	53.3	35.0	29.0	25.0	25.0	24.0	23.0	21.7	22.2	21.6
	0.4	1.4	2.3	2.6	2.7	1.7	1.4	1.2	1.2	1.2	1.1	1.1	1.1	1.1
Denmark	...	...	...	...	...	8.0	6.0	16.0	38.0	46.0	45.0	58.0	74.7	94.0
	...	...	...	...	...	0.4	0.3	0.8	1.9	2.3	2.2	2.9	3.7	4.7
France	1.4	2.5	38.6	59.5	45.8	20.0	26.0	34.0	33.0	32.0	35.0	49.0	59.0	63.5
	0.1	0.1	1.9	3.0	2.3	1.0	1.3	1.7	1.6	1.6	1.7	2.4	2.9	3.2
Germany, Fed. Rep.	20.1	22.2	107.3	155.0	147.2	94.0	90.0	86.0	84.0	81.0	79.0	80.5	80.0	73.8
	1.0	1.1	5.3	7.7	7.3	4.7	4.5	4.3	4.2	4.0	3.9	4.0	4.0	3.7
Greece	...	...	...	...	...	...	...	8.0	21.0	25.0	27.0	26.4	26.4	24.4
	...	...	...	...	...	...	...	0.4	1.0	1.2	1.3	1.3	1.3	1.2
Italy	0.2	0.2	37.5	47.0	26.3	30.0	39.0	37.0	28.0	37.0	45.0	41.7	49.0	50.6
	...	...	1.9	2.3	1.3	1.5	1.9	1.8	1.4	1.8	2.2	2.1	2.4	2.5
Netherlands	...	13.4	36.0	37.0	35.8	25.0	25.0	27.0	28.0	42.0	61.0	69.0	79.0	91.3
	...	0.7	1.8	1.8	1.8	1.2	1.2	1.3	1.4	2.1	3.0	3.4	3.9	4.5
Norway	...	...	...	...	...	403.0	528.0	508.0	488.0	600.0	688.0	771.0	823.3	973.3
	...	...	...	...	...	20.1	26.3	25.3	24.3	29.9	34.3	38.4	41.0	48.5
Spain	...	...	...	...	3.1	23.2	32.0	24.0	30.0	59.0	45.0	45.3	37.2	32.8
	...	...	...	...	0.2	1.2	1.6	1.2	1.5	2.9	2.2	2.3	1.9	1.6
United Kingdom	0.3	0.9	1.7	1.7	1.7	1,568.0	1,619.0	1,790.0	2,050.0	2,260.0	2,452.0	2,519.8	2,602.0	2,445.9
	...	...	0.1	0.1	0.1	78.1	80.6	89.1	102.1	112.5	122.1	125.5	129.6	121.8
Total	29.7	67.1	266.5	353.3	313.2	2,206.2	2,394.0	2,555.0	2,825.0	3,206.0	3,500.0	3,682.4	3,852.8	3,870.6
	1.5	3.3	13.3	17.5	15.7	109.9	119.1	127.1	140.6	159.5	174.0	183.4	191.8	192.8

ASIA-PACIFIC

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987
Australia	...	...	...	7.2	175.6	441.0	379.0	382.0	353.0	405.0	481.0	556.0	472.0	566.1
	...	...	...	0.4	8.7	22.0	18.9	19.0	17.6	20.2	24.0	27.7	23.5	28.2
Bangladesh	...	...	...	...	...	...	...	...	...	...	...	...	...	0.5
	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Brunei	19.3	84.8	92.9	80.4	148.0	256.0	230.0	166.0	155.0	155.0	160.0	149.5	170.0	133.7
	1.0	4.2	4.6	4.0	7.4	12.7	11.5	8.3	7.7	7.7	8.0	7.4	8.5	6.7
Burma	21.1	1.5	11.1	12.1	16.4	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	24.0
	1.1	0.1	0.6	0.6	0.8	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.2
India	3.9	5.1	9.0	61.8	138.6	245.0	182.0	298.0	384.0	390.0	543.0	614.0	622.7	608.7
	0.2	0.3	0.4	3.1	6.9	12.2	9.1	14.8	19.1	19.4	27.0	30.6	31.0	30.3
Indonesia	169.4	132.6	411.2	485.0	853.6	1,595.0	1,576.0	1,607.0	1,341.0	1,292.0	1,332.0	1,219.5	1,243.8	1,185.8
	8.4	6.6	20.5	24.2	42.5	79.4	78.5	80.0	66.8	64.3	66.3	60.7	61.9	59.1
Japan	7.2	5.6	10.2	11.4	16.3	8.0	10.0	7.0	6.0	6.9	6.4	10.0	12.8	12.1
	0.4	0.3	0.5	0.6	0.8	0.4	0.5	0.3	0.3	0.3	0.3	0.5	0.6	0.6
Malaysia	...	...	...	...	...	259.0	288.0	259.0	306.0	370.0	462.0	432.8	503.3	467.4
	...	...	...	...	...	12.9	14.3	12.9	15.2	18.4	23.0	21.6	25.1	23.3
New Guinea	...	4.8	4.2	...	...	...	...	...	...	...	...	...	...	...
	...	0.2	0.2	...	...	...	...	...	...	...	...	...	...	...
New Zealand	...	...	...	...	...	9.0	7.0	10.0	15.0	15.0	18.0	18.0	29.3	28.3
	...	...	...	...	...	0.4	0.3	0.5	0.7	0.7	0.9	0.9	1.5	1.4
Pakistan	2.4	3.5	7.2	11.2	9.9	10.0	10.0	10.0	12.0	13.0	18.0	34.3	41.0	41.6
	0.1	0.2	0.4	0.6	0.5	0.5	0.5	0.5	0.6	0.6	0.9	1.7	2.0	2.1
Philippines	...	...	...	...	...	26.0	15.0	2.0	7.0	15.0	12.0	9.3	6.3	5.1
	...	...	...	...	...	1.3	0.7	0.1	0.3	0.7	0.6	0.5	0.3	0.3
Taiwan	...	...	0.4	0.4	1.8	5.0	5.0	3.0	3.0	2.3	2.6	2.7	1.9	2.6
	...	...	...	...	0.1	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Thailand	...	...	...	...	0.4	...	...	...	6.0	11.0	19.0	34.3	35.6	31.3
	...	...	...	...	...	...	...	...	0.3	0.5	0.9	1.7	1.8	1.6
Total	223.3	237.9	546.2	669.5	1,360.6	2,884.0	2,732.0	2,774.0	2,618.0	2,705.2	3,084.0	3,110.4	3,168.7	3,107.2
	11.2	11.9	27.2	33.5	67.7	143.5	136.0	138.0	130.2	134.4	153.5	154.9	157.8	154.9

AFRICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987
Algeria	...	...	182.7	551.6	1,029.1	1,175.0	1,016.0	750.0	750.0	686.6	608.0	643.3	600.7	647.9
	...	...	9.1	27.5	51.2	58.5	50.6	37.4	37.4	34.2	30.3	32.0	29.9	32.3
Angola (inc. Cabinda)	...	...	1.3	13.0	13.7	147.0	150.0	140.0	122.0	174.0	207.0	228.5	280.7	341.3
	...	...	0.1	0.6	0.7	7.3	7.5	7.0	6.1	8.7	10.3	11.4	14.0	17.0
Cameroon	...	...	...	...	...	34.0	58.0	87.0	109.0	114.0	125.0	133.5	180.0	170.0
	...	...	...	...	...	1.7	2.9	4.3	5.4	5.7	6.2	6.6	9.0	8.5
Congo	...	...	...	...	...	57.0	56.0	79.0	87.0	95.0	118.0	115.1	113.0	118.0
	...	...	...	...	...	2.8	2.8	3.9	4.3	4.7	5.9	5.7	5.7	5.9
Egypt	18.1	44.9	61.6	122.7	327.3	526.0	596.0	578.0	667.0	690.0	790.0	885.8	773.7	899.3
	0.9	2.2	3.1	6.1	16.3	26.2	29.7	28.8	33.2	34.4	39.3	44.1	38.5	44.8
Gabon	...	...	16.1	25.2	102.8	204.0	180.0	147.0	130.0	150.0	150.0	150.0	146.2	155.8
	...	...	0.8	1.3	5.4	10.2	9.0	7.3	6.5	7.5	7.5	7.5	7.3	7.8
Ivory Coast	...	...	...	...	...	...	...	7.0	9.0	24.0	22.0	28.0	20.0	16.0
	...	...	...	...	...	...	...	0.3	0.4	1.2	1.1	1.4	1.0	0.8
Libya	...	...	...	1,220.0	3,318.0	2,066.0	1,785.0	1,063.0	1,127.0	1,020.0	1,090.0	1,045.3	1,036.7	1,019.7
	...	...	...	60.8	165.2	102.9	88.9	52.9	56.1	50.8	54.3	52.1	51.3	50.8
Nigeria	...	...	17.3	272.2	1,083.3	2,303.0	2,057.0	1,369.0	1,324.0	1,232.0	1,414.0	1,445.5	1,464.0	1,238.6
	...	...	0.9	13.6	53.9	114.7	102.4	68.2	65.9	61.4	70.4	72.0	72.9	61.7
Tunisia	...	...	3.0	3.6	87.7	100.0	110.0	118.0	106.0	115.0	114.0	125.0	108.0	104.3
	...	...	0.1	0.2	4.4	5.0	5.5	5.9	5.3	5.7	5.7	6.2	5.3	5.2
Zaire	...	...	...	...	...	21.0	20.0	20.0	22.0	26.0	27.0	30.5	32.1	31.8
	...	...	...	...	...	1.0	1.0	1.0	1.1	1.3	1.3	1.5	1.6	1.6
Others	...	0.6	3.0	3.6	1.5	5.0	4.0	2.2	1.7	6.6	7.7	8.9	7.6	12.3
	...	...	0.1	0.2	0.1	0.2	0.2	0.1	0.1	0.3	0.4	0.4	0.4	0.6
Total	**18.1-**	**45.7**	**285.0**	**2,211.9**	**5,969.4**	**6,638.0**	**6,032.0**	**4,360.2**	**4,454.7**	**4,333.2**	**4,672.7**	**4,839.4**	**4,756.7**	**4,755.0**
	0.9	**2.2**	**14.2**	**110.3**	**297.2**	**330.5**	**300.5**	**217.1**	**221.8**	**215.9**	**232.7**	**240.9**	**236.9**	**237.0**

LATIN AMERICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987
Argentina	56.3 2.8	64.0 3.2	171.9 8.6	269.3 13.4	382.9 19.1	467.0 23.3	487.0 24.3	497.0 24.8	483.0 24.1	481.0 24.0	467.0 23.3	447.5 22.3	430.2 21.4	419.1 20.9
Bolivia	0.8 ...	1.7 0.1	9.8 0.5	9.2 0.5	16.3 0.8	30.0 1.5	30.0 1.5	24.0 1.2	24.0 1.2	22.0 1.1	20.0 1.0	20.0 1.0	18.7 0.9	16.5 0.8
Brazil	... ...	0.9 ...	80.9 4.0	94.0 4.7	160.5 8.0	161.0 8.0	182.0 9.1	215.0 10.7	252.0 12.5	315.0 15.7	437.0 21.8	540.5 26.9	578.0 28.8	562.8 28.0
Chile	... ...	1.7 0.1	19.6 1.0	34.9 1.7	34.6 1.7	23.0 1.1	29.0 1.4	40.0 2.0	41.0 2.0	39.0 1.9	38.0 1.9	32.5 1.6	34.4 1.7	28.3 1.4
Colombia	69.9 3.5	93.3 4.6	152.7 7.6	210.0 10.5	214.0 10.7	124.0 6.2	125.0 6.2	125.0 6.2	140.0 7.0	155.0 7.7	165.0 8.2	178.8 8.9	324.2 16.1	387.8 19.3
Ecuador	8.4 0.3	7.2 0.4	7.7 0.4	8.0 0.4	4.1 0.2	225.0 11.2	222.0 11.1	204.0 10.2	215.0 10.7	236.0 11.8	254.0 12.6	273.3 13.6	270.1 13.5	157.2 7.8
Guatemala	... ...	... ...	... ...	... ...	... ...	2.0 0.1	5.0 0.2	5.0 0.2	6.4 0.3	7.5 0.4	5.2 0.3	3.1 0.2	4.9 0.2	3.9 0.2
Mexico	120.3 6.0	198.5 9.9	270.6 13.5	323.1 16.1	430.2 21.4	1,461.0 72.8	1,936.0 96.4	2,390.0 119.0	2,734.0 136.2	2,702.0 134.6	2,743.0 136.6	2,797.0 139.3	2,468.0 122.9	2,537.8 126.4
Peru	33.2 1.7	41.1 2.0	52.6 2.6	63.2 3.1	72.2 3.6	195.0 9.7	191.0 9.5	184.0 9.2	198.0 9.9	171.0 8.5	201.0 10.0	189.0 9.4	179.0 8.9	166.7 8.3
Trinidad & Tobago	60.9 3.0	56.5 2.8	115.7 5.8	133.9 6.7	139.8 7.0	215.0 10.7	211.0 10.5	240.0 12.0	182.0 9.1	158.0 7.9	169.0 8.4	179.0 8.9	167.9 8.4	163.1 8.1
Venezuela	507.0 25.2	1,498.0 74.6	2,846.1 141.7	3,472.9 173.0	3,708.0 184.7	2,356.0 117.3	2,167.0 107.9	2,093.0 104.2	1,826.0 90.9	1,791.0 89.2	1,724.0 85.9	1,669.0 83.1	1,664.9 82.9	1,591.9 79.3
Others	... ...	... ...	... ...	... ...	... ...	... ...	... ...	0.7 ...	0.6 ...	0.5 ...	2.2 0.1	2.9 0.1	3.6 0.2	3.6 0.2
Total	**854.8** **42.5**	**1,962.9** **97.7**	**3,727.8** **185.7**	**4,618.5** **230.1**	**5,162.6** **257.2**	**5,259.0** **261.9**	**5,585.0** **278.1**	**6,017.7** **299.7**	**6,102.0** **303.9**	**6,078.0** **302.8**	**6,225.4** **310.1**	**6,332.6** **315.3**	**6,143.9** **305.9**	**6,040.7** **300.8**
Total non-Communist	5,131.9 255.6	9,556.0 475.9	17,718.7 882.4	24,818.4 1,236.1	37,047.7 1,845.0	48,524.2 2,416.1	45,103.0 2,246.0	41,278.2 2,056.2	39,352.0 1,908.4	38,098.6 1,898.2	39,120.0 1,947.8	38,643.8 1,924.5	40,562.8 2,019.7	40,164.0 2,000.6

COMMUNIST AREAS

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1965	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987
Bulgaria	... ...	... ...	4.0 0.2	4.6 0.2	6.7 0.3	5.3 0.3	6.0 0.3	6.0 0.3	3.0 0.1	3.0 0.1	3.0 0.1	3.0 0.1	3.0 0.1	6.0 0.3
China	... ...	4.0 0.2	100.0 5.0	220.0 11.0	500.0 24.9	2,130.5 106.1	2,119.0 105.5	2,024.4 100.8	2,042.0 101.7	2,120.0 105.6	2,250.0 112.1	2,496.0 124.3	2,620.0 130.5	2,700.0 134.5
Czechoslovakia	... ...	0.8 ...	2.7 0.1	3.9 0.2	4.1 0.2	2.2 0.1	1.9 0.1	1.7 0.1	2.0 0.1	2.0 0.1	2.0 0.1	2.0 0.1	2.0 0.1	2.0 0.1
German Dem. Rep.*	... ...	1.0 ...	1.0 ...	1.0 ...	1.2 0.1	10.0 0.5	10.0 0.5	10.0 0.5	10.0 0.5	10.0 0.5	10.0 0.5	10.0 0.5	10.0 0.5	10.0 0.5
Hungary	... ...	10.1 0.5	24.3 1.2	36.1 1.8	38.7 1.9	40.7 2.0	40.6 2.0	40.5 2.0	41.0 2.0	40.0 2.0	40.0 2.0	40.0 2.0	40.0 2.0	40.0 2.0
Poland	... ...	3.3 0.2	3.9 0.2	6.8 0.3	8.5 0.4	6.6 0.3	6.6 0.3	6.0 0.3	4.0 0.2	5.0 0.2	5.0 0.2	5.0 0.2	4.0 0.2	4.0 0.2
Romania	... ...	87.7 4.4	231.0 11.5	252.4 12.6	268.6 13.4	247.0 12.3	230.9 11.5	232.0 11.6	234.0 11.7	240.0 12.0	229.0 11.4	226.0 11.3	220.0 11.0	215.0 10.7
U.S.S.R.*	624.9 31.1	760.6 37.9	2,969.1 147.9	4,877.3 242.9	7,089.2 353.0	11,758.5 585.6	12,031.0 599.1	12,180.0 606.6	12,260.0 610.5	12,320.0 613.5	12,260.0 610.5	11,900.0 592.6	12,300.0 612.5	12,480.0 621.5
Yugoslavia	0.3 ...	2.1 0.1	18.8 0.9	40.7 2.0	57.8 2.9	70.0 3.5	84.5 4.2	87.6 4.4	87.0 4.3	82.0 4.1	80.0 4.0	81.0 4.0	83.0 4.1	84.0 4.2
Other	... ...	2.7 0.1	14.9 0.7	19.0 0.9	37.1 1.8	50.0 2.5	50.0 2.5	57.2 2.8	81.0 4.0	86.0 4.3	96.0 4.8	86.0 4.3	77.0 3.8	80.0 4.0
Total	**625.2** **31.1**	**872.3** **43.4**	**3,369.7** **167.7**	**5,461.8** **271.9**	**8,011.9** **398.9**	**14,320.8** **713.2**	**14,580.0** **726.0**	**14,645.4** **729.4**	**14,764.0** **735.1**	**14,908.0** **742.4**	**14,975.0** **745.7**	**14,849.0** **739.4**	**15,359.0** **764.8**	**15,621.0** **778.0**
Includes est. for DDR														
World Total	5,757.1 286.7	10,428.3 519.3	21,088.4 1,050.1	30,280.2 1,508.0	45,059.1 2,243.9	62,845.0 3,129.3	59,683.5 2,972.0	55,921.6 2,784.6	53,116.0 2,644.5	53,006.6 2,639.2	54,095.0 2,693.6	53,492.8 2,663.9	55,921.8 2,784.5	55,785.0 2,778.6

World oil consumption

Upper figures = 1,000 b/d
Lower figures = million t/y

	1984	1985	1986
U.S.A.	15,175 726.8	15,170 724.2	15,560 746.8
Canada	1,425 66.7	1,490 68.5	1,455 67.1
Total North America	16,600 793.5	16,660 792.7	17,015 813.9
Latin America	4,420 210.0	4,425 209.7	4,535 215.4
Total Western Hemisphere	**21,020 1,003.5**	**21,085 1,002.4**	**21,550 1,029.3**
Austria	200 9.8	200 9.8	210 10.2
Belgium & Luxembourg	420 20.4	430 20.8	480 23.3
Denmark	210 10.4	220 10.7	215 10.5
Finland	215 10.6	220 10.8	230 11.3
France	1,815 85.9	1,790 84.3	1,820 85.5
Germany, Fed. Rep.	2,330 110.6	2,390 112.9	2,525 119.6
Greece	235 11.7	245 12.0	250 12.2
Ireland	85 4.1	85 4.0	90 4.4
Italy	1,735 84.9	1,730 84.4	1,775 86.5
Netherlands	625 28.7	635 29.2	690 32.0
Norway	190 8.6	200 9.0	205 9.4
Portugal	195 9.5	180 8.8	200 9.5
Spain	955 44.8	925 42.9	930 43.2
Sweden	360 17.5	375 18.3	370 18.0
Switzerland	250 11.8	255 12.0	280 13.2
Turkey	370 17.0	345 16.8	390 18.8
United Kingdom	1,850 89.6	1,630 77.4	1,640 77.0
Other	45 2.2	45 2.3	50 2.5
Total Western Europe	12,085 578.1	11,900 566.4	12,350 587.1
Middle East	2,155 108.5	2,150 108.3	2,150 108.3
Africa	1,630 78.9	1,700 82.1	1,690 81.7
South Asia	1,030 50.4	1,105 53.6	1,165 56.3
Southeast Asia	2,315 114.7	2,280 109.9	2,435 117.3
Japan	4,565 215.1	4,380 203.4	4,415 204.4
Australasia	695 32.4	670 30.8	685 31.3
U.S.S.R.	8,895 440.7	8,910 440.3	9,005 445.0
Eastern Europe	2,490 121.6	2,530 123.5	2,485 121.1
China	1,750 87.5	1,785 88.9	1,990 99.2
Total Eastern Hemisphere	**37,610 1,827.9**	**37,410 1,807.2**	**38,370 1,851.7**
World excl. U.S.S.R. China & E. Europe	45,495 2,181.6	45,270 2,156.9	46,440 2,215.7
World Total	**58,630 2,831.4**	**58,495 2,809.6**	**59,920 2,881.0**

Source: British Petroleum
South Asia—Afghanistan, Bangladesh, Burma, India, Nepal, Pakistan, Sri Lanka Southeast Asia—Brunei, Malaysia, Indonesia, Hong Kong, South Korea, Philippines, Singapore, Thailand, Taiwan, Papua New Guinea, SW Pacific Islands, Australasia—Australia, New Zealand

Worldwide refining capacity

EUROPE

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Austria	...	26	47	98	280	280	280	244	269	268	273	204	204	204
	...	1.3	2.3	4.9	13.9	13.9	13.9	12.2	13.4	13.3	13.6	10.2	10.2	10.2
Belgium	12	16	171	699	972	1,064	1,056	1,035	693	694	693	652	648	631
	0.6	0.8	8.5	34.8	48.4	53.0	52.6	51.5	34.5	34.6	34.5	32.5	32.3	31.4
Cyprus	...	...	...	...	15	16	16	16	15	15	16	16	16	16
	...	...	...	...	0.7	0.8	0.8	0.8	0.8	0.7	0.8	0.8	0.8	0.8
Denmark	1	1	...	173	215	214	215	215	215	174	176	166	166	177
	...	...	...	8.6	10.7	10.7	10.7	10.7	10.7	8.7	8.8	8.3	8.3	8.8
Finland	...	...	25	176	336	336	336	299	299	299	299	241	241	241
	...	...	1.2	8.8	16.7	16.7	16.7	14.9	14.9	14.9	14.9	12.0	12.0	12.0
France	152	306	769	2,405	3,469	3,385	3,342	3,291	2,871	2,670	2,386	1,947	1,834	1,941
	7.6	15.2	38.3	119.8	172.8	168.6	166.4	163.9	143.0	133.0	118.8	97.0	91.3	96.7
Germany, Fed. Rep.	48	81	573	2,351	3,103	2,986	3,021	2,937	2,471	2,386	2,172	1,933	1,720	1,648
	2.4	4.0	28.5	117.1	154.5	148.7	150.4	146.3	123.1	118.8	108.2	96.3	85.7	82.1
Greece	...	...	30	95	411	431	428	427	422	369	390	390	385	385
	...	...	1.5	4.7	20.5	21.5	21.3	21.3	21.0	18.4	19.4	19.4	19.2	19.2
Ireland	11	...	40	54	56	56	56	56	56	56	56	56	56	56
	0.5	...	2.0	2.7	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8
Italy	41	107	773	3,214	4,197	4,131	4,092	4,003	3,283	3,050	3,095	2,738	2,679	2,563
	2.0	5.3	38.5	160.1	209.0	205.7	203.8	199.3	163.5	151.9	154.1	136.4	133.4	127.6
Netherlands	15	77	359	1,456	1,857	1,828	1,827	1,708	1,552	1,552	1,499	1,468	1,401	1,381
	0.7	3.8	17.9	72.5	92.5	91.0	91.0	85.1	77.3	77.3	74.7	73.1	69.8	68.8
Norway	1	1	2	113	264	264	253	243	243	243	244	240	240	240
	...	...	0.1	5.6	13.1	13.1	12.6	12.1	12.1	12.1	12.2	12.0	12.0	12.0
Portugal	4	8	23	82	361	378	341	365	365	282	290	296	294	294
	0.2	0.4	1.1	4.1	18.0	18.8	17.0	18.2	18.2	14.0	14.4	14.7	14.6	14.6
Spain	11	17	144	734	1,425	1,455	1,464	1,517	1,522	1,493	1,493	1,367	1,305	1,305
	0.5	0.8	7.2	36.6	71.0	72.5	72.9	75.5	75.8	74.4	74.4	68.1	65.0	65.0
Sweden	4	26	48	253	411	458	451	471	453	453	439	429	437	437
	0.2	1.3	2.4	12.6	20.5	22.8	22.5	23.5	22.6	22.6	21.9	21.4	21.8	21.8
Switzerland	...	...	...	106	137	137	102	137	137	137	127	137	65	132
	...	...	...	5.3	6.8	6.8	5.1	6.8	6.8	6.8	6.3	6.8	3.2	6.6
United Kingdom	133	197	962	2,420	2,527	2,527	2,629	2,482	2,260	2,092	2,007	1,792	1,780	1,803
	6.6	9.8	47.9	120.5	125.8	125.8	130.9	123.6	112.5	104.2	99.9	89.2	88.6	89.8
Yugoslavia	5	8	10	228	293	296	297	297	297	297	297	302	483	608
	0.2	0.4	0.5	11.4	14.6	14.7	14.8	14.8	14.8	14.8	14.8	15.0	24.1	30.3
Total Europe	**438**	**871**	**3,976**	**14,657**	**20,329**	**20,242**	**20,206**	**19,743**	**17,424**	**16,530**	**15,952**	**14,374**	**13,954**	**14,062**
	21.5	**43.1**	**197.9**	**730.1**	**1,012.3**	**1,007.9**	**1,006.2**	**983.3**	**867.8**	**823.3**	**794.5**	**716.0**	**695.1**	**700.5**

NORTH AMERICA

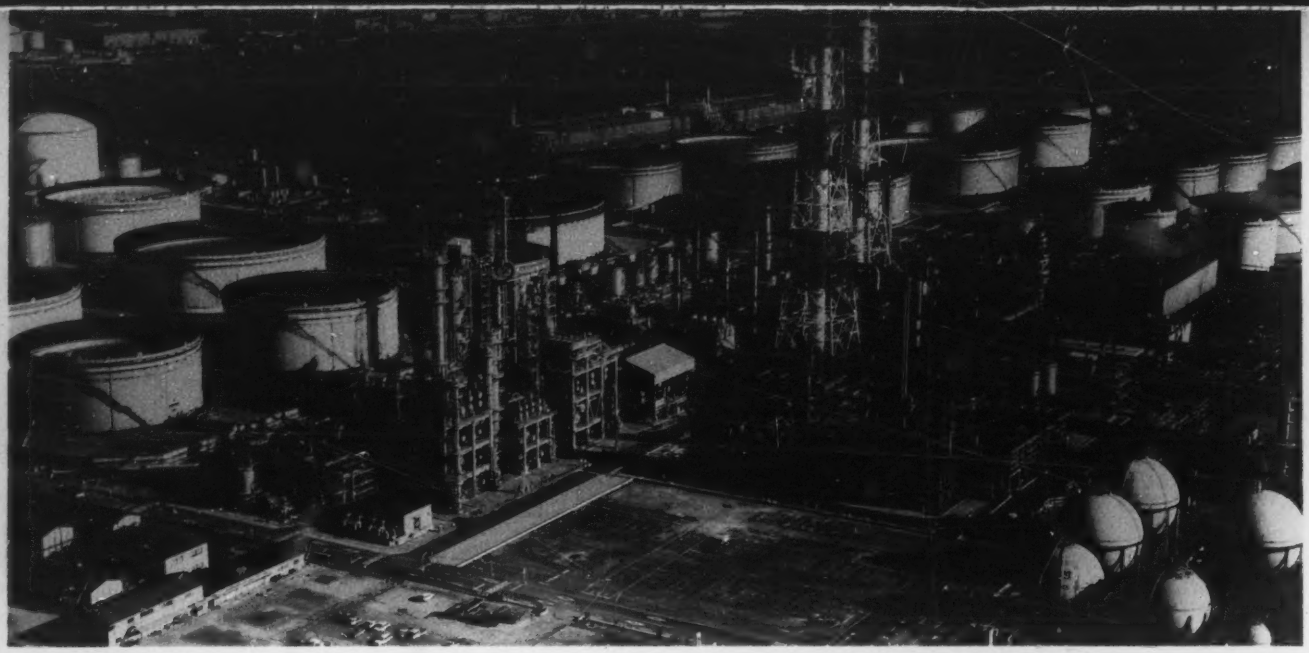
Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Canada	203	329	1,002	1,355	2,225	2,222	2,168	2,200	2,020	1,807	1,869	1,856	1,760	1,869
	10.1	16.4	49.9	67.5	110.8	110.7	107.8	109.6	100.6	90.0	93.1	92.4	87.6	93.1
United States	4,460	6,696	10,400	12,079	17,150	17,720	18,470	18,700	16,800	15,930	15,400	15,182	15,258	15,288
	222.1	333.5	517.9	601.5	854.1	882.5	919.8	931.3	836.6	793.3	766.9	756.1	759.8	761.3
Total	**4,663**	**7,025**	**11,402**	**13,434**	**19,375**	**19,942**	**20,638**	**20,900**	**18,820**	**17,737**	**17,269**	**17,038**	**17,018**	**17,157**
	232.2	**349.9**	**567.8**	**669.0**	**964.9**	**993.2**	**1,027.8**	**1,040.9**	**937.2**	**883.3**	**860.0**	**848.5**	**847.4**	**854.4**

LATIN AMERICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Argentina	103 5.1	152 7.6	238 11.9	502 25.0	655 32.6	676 33.7	679 33.8	677 33.7	676 33.7	678 33.8	678 33.8	667 33.2	670 33.4	690 34.4
Bahamas	... ...	... ...	... ...	... ...	500 24.9	500 24.9	500 24.9	500 24.9	500 24.9	500 24.9	350 17.4	... ...	... ...	... ...
Barbados	... ...	... ...	... ...	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1	3 0.1
Bolivia	1 ...	7 0.3	12 0.6	21 1.0	74 3.7	74 3.7	74 3.7	61 3.0	61 3.0	47 2.3	47 2.3	47 2.3	47 2.3	47 2.3
Brazil	4 0.2	12 0.6	156 7.8	575 28.6	1,209 60.2	1,205 60.0	1,402 69.8	1,407 70.1	1,219 60.7	1,301 64.8	1,305 65.0	1,305 65.0	1,321 65.8	1,407 70.1
Chile	1 ...	4 0.2	24 1.2	115 5.7	144 7.2	139 6.9	139 6.9	141 7.0	141 7.0	141 7.0	141 7.0	141 7.0	150 7.5	141 7.0
Colombia	15 0.7	24 1.2	51 2.5	140 7.0	174 8.7	193 9.6	199 9.9	199 9.9	214 10.7	211 10.5	211 10.5	211 10.5	226 11.3	226 11.3
Costa Rica	... ...	... ...	... ...	8 0.4	12 0.6	11 0.5	15 0.7	15 0.7	16 0.8	17 0.8	16 0.8	15 0.7	16 0.8	16 0.8
Cuba	4 0.2	7 0.3	87 4.3	93 4.6	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0	160 8.0
Ecuador	2 0.1	5 0.2	7 0.3	37 1.8	93 4.6	86 4.3	87 4.3	90 4.5	79 3.9	84 4.2	82 4.1	88 4.4	88 4.4	122 6.1
El Salvador	... ...	... ...	... ...	14 0.7	17 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	17 0.8	17 0.8
Guatemala	... ...	... ...	... ...	21 1.0	14 0.7	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8	16 0.8
Honduras	... ...	... ...	... ...	10 0.5	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7	14 0.7
Jamaica	... ...	... ...	... ...	28 1.4	33 1.6	34 1.7	22 1.1	22 1.1	36 1.8	36 1.8	36 1.8	36 1.8	36 1.8	36 1.8
Mexico	98 4.9	160 8.0	357 17.8	515 25.6	1,244 62.0	1,394 69.4	1,394 69.4	1,470 73.2	1,289 64.2	1,269 63.2	1,269 63.2	1,269 63.2	1,349 67.2	1,354 67.4
Netherlands Antilles	495 24.7	617 30.7	680 33.9	795 39.6	842 41.9	792 39.4	782 38.9	782 38.9	782 38.9	740 36.9	740 36.9	320 15.9	320 15.9	320 15.9
Nicaragua	... ...	... ...	... ...	21 1.0	15 0.7	14 0.7	14 0.7	14 0.7	14 0.7	15 0.7	15 0.7	15 0.7	15 0.7	15 0.7
Panama	... ...	... ...	... ...	140 7.0	100 5.0	100 5.0	100 5.0	100 5.0	100 5.0	100 5.0	100 5.0	100 5.0	100 5.0	100 5.0
Paraguay	... ...	... ...	... ...	5 0.2	5 0.2	7 0.3	8 0.4	8 0.4	8 0.4	8 0.4	8 0.4	8 0.4	8 0.4	8 0.4
Peru	22 1.1	35 1.7	49 2.4	104 5.2	171 8.5	170 8.5	169 8.4	162 8.1	168 8.4	169 8.4	176 8.8	176 8.8	176 8.8	182 9.1
Puerto Rico	... ...	... ...	84 4.2	155 7.7	284 14.1	284 14.1	284 14.1	284 14.1	123 6.1	121 6.0	121 6.0	121 6.0	121 6.0	123 6.1
Trinidad & Tobago	49 2.4	104 5.2	182 9.1	417 20.8	461 23.0	456 22.7	456 22.7	456 22.7	375 18.7	375 18.7	320 15.9	260 12.9	300 14.9	300 14.9
Uruguay	5 0.2	16 0.8	28 1.4	40 2.0	43 2.1	40 2.0	40 2.0	45 2.2	45 2.2	45 2.2	45 2.2	45 2.2	45 2.2	45 2.2
Venezuela	55 2.7	254 12.6	886 44.1	1,324 65.9	1,446 72.0	1,446 72.0	1,349 67.2	1,323 65.9	1,284 63.9	1,224 61.0	1,224 61.0	1,230 61.3	1,225 61.0	1,201 59.8
Virgin Islands	... ...	... ...	... ...	220 11.0	728 36.3	728 36.3	728 36.3	640 31.9	600 29.9	600 29.9	545 27.1	600 29.9	600 29.9	545 27.1
Others	... ...	... ...	... ...	31 1.5	60 3.0	62 3.1	62 3.1	59 2.9	77 3.8	55 2.7	57 2.8	57 2.8	57 2.8	61 3.0
Total	854 42.3	1,397 69.4	2,841 141.5	5,334 265.3	8,501 423.2	8,620 429.2	8,712 433.7	8,664 431.3	8,016 399.1	7,945 395.6	7,695 383.1	6,920 344.4	7,080 352.5	7,149 355.8



ASIA-PACIFIC

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Australia	4 0.2	14 0.7	237 11.8	581 28.9	708 35.3	725 36.1	743 37.0	742 37.0	716 35.7	722 36.0	697 34.7	623 31.0	626 31.2	637 31.7
Bangladesh	... ...	... ...	... ...	... ...	31 1.5	31 1.5	31 1.5	31 1.5	31 1.5	22 1.1	31 1.5	31 1.5	31 1.5	31 1.5
Brunei-Malaysia-Singapore	10 0.5	10 0.5	46 2.3	302 15.0	1,058 52.7	1,093 54.4	1,246 62.1	1,271 63.3	1,271 63.3	1,313 65.4	1,286 64.0	1,240 61.8	1,183 58.9	1,080 53.8
Burma*	... ...	... ...	... ...	... ...	26 1.3	26 1.3	26 1.3	26 1.3	26 1.3	26 1.3	26 1.3	26 1.3	26 1.3	26 1.3
Guam*	... ...	... ...	... ...	... ...	30 1.5	44 2.2	44 2.2	44 2.2	44 2.2	44 2.2	44 2.2	... ...	... ...	... ...
India	10 0.5	6 0.3	112 5.6	436 21.7	626 31.2	557 27.7	557 27.7	557 27.7	753 37.5	779 38.8	705 35.1	867 43.2	991 49.4	1,059 52.7
Indonesia	170 8.5	203 10.1	274 13.6	268 13.3	528 26.3	528 26.3	445 22.2	498 24.8	341 17.0	387 19.3	631 31.4	636 31.7	636 31.7	714 35.6
Japan	53 2.6	34 1.7	640 31.9	2,796 139.2	5,480 272.9	5,509 274.3	5,454 271.6	5,601 278.9	5,548 276.3	5,020 250.0	4,813 239.7	4,613 229.7	4,790 238.5	4,567 227.4
Korea, South	... ...	... ...	... ...	175 8.7	542 27.0	601 29.9	607 30.2	755 37.6	755 37.6	776 38.6	776 38.6	782 38.9	862 42.9	820 40.8
New Zealand*	... ...	... ...	... ...	... ...	74 3.7	74 3.7	74 3.7	74 3.7	74 3.7	74 3.7	53 2.6	53 2.6	54 2.7	82 4.1
Okinawa*	... ...	... ...	... ...	... ...	196 9.8	198 9.9	208 10.4	208 10.4	183 9.1	153 7.6	153 7.6	110 5.5	... ...	... ...
Pakistan	... ...	5 0.2	6 0.3	115 5.7	110 5.5	98 4.9	122 6.1	133 6.6	133 6.6	126 6.3	129 6.4	130 6.5	130 6.5	130 6.5
Philippines	... ...	... ...	22 1.1	180 9.0	253 12.6	253 12.6	246 12.3	286 14.2	286 14.2	286 14.2	286 14.2	216 10.8	286 14.2	286 14.2
Sri Lanka*	... ...	... ...	... ...	... ...	38 1.9	38 1.9	50 2.5	50 2.5	50 2.5	50 2.5	50 2.5	50 2.5	50 2.5	50 2.5
Taiwan	... ...	... ...	28 1.4	129 6.4	425 21.2	425 21.2	515 25.6	515 25.6	515 25.6	515 25.6	543 27.0	543 27.0	543 27.0	600 29.9
Thailand	... ...	... ...	1 0.1	62 3.1	161 8.0	186 9.3	186 9.3	176 8.8	176 8.8	176 8.8	172 8.6	192 9.6	192 9.6	192 9.6
Others	27 1.3	4 0.2	9 0.4	137 6.8	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...	... ...
Total	274 13.6	276 13.7	1,375 68.4	5,181 257.8	10,296 512.4	10,386 517.2	10,554 525.7	10,967 546.1	10,822 542.9	10,409 521.4	10,385 517.4	10,112 503.8	10,400 517.9	10,274 511.8

*Data in 1979, included in others

AFRICA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Algeria	...	...	...	47	122	122	122	122	137	137	464	465	465	465
	...	...	...	2.3	6.1	6.1	6.1	6.1	6.8	6.8	23.1	23.2	23.2	23.2
Angola-Cabinda	...	...	2	20	32	36	31	32	32	32	32	32	32	32
	...	...	0.1	1.0	1.6	1.8	1.5	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Cameroon*	...	...	...	...	...	...	...	43	43	41	43	43	43	43
	...	...	...	...	...	...	...	2.1	2.1	2.0	2.1	2.1	2.1	2.1
Congo*	...	...	...	...	...	...	...	...	...	21	21	21	21	21
	...	...	...	...	...	...	...	...	...	1.0	1.0	1.0	1.0	1.0
Egypt	17	39	87	193	251	234	292	292	341	369	369	434	452	452
	0.8	1.9	4.3	9.6	12.5	11.7	14.5	14.5	17.0	18.4	18.4	21.6	22.5	22.5
Ethiopia*	...	...	...	...	14	14	14	14	14	15	14	18	18	18
	...	...	...	...	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.9	0.9	0.9
Gabon*	...	...	...	...	20	20	20	20	20	20	20	23	16	23
	...	...	...	...	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	0.8	1.1
Ghana	...	...	...	29	26	26	26	27	27	28	28	28	28	28
	...	...	...	1.4	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4
Ivory Coast	...	...	...	19	39	50	50	50	90	90	90	90	73	60
	...	...	...	0.9	1.9	2.5	2.5	2.5	4.5	4.5	4.5	4.5	3.6	3.0
Kenya	...	...	...	44	95	95	95	79	79	79	95	95	95	90
	...	...	...	2.2	4.7	4.7	4.7	3.9	3.9	3.9	4.7	4.7	4.7	4.5
Liberia*	...	...	...	...	15	15	15	15	15	15	15	15	15	15
	...	...	...	...	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Libya	...	...	...	10	137	138	142	130	130	125	330	330	329	329
	...	...	...	0.5	6.8	6.9	7.1	6.5	6.5	6.2	16.4	16.4	16.4	16.4
Madagascar*	...	...	...	...	11	11	11	11	16	16	16	16	16	16
	...	...	...	...	0.5	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.8	0.8
Morocco	...	...	2	35	72	72	72	72	74	74	80	81	81	155
	...	...	0.1	1.7	3.6	3.6	3.6	3.6	3.7	3.7	4.0	4.0	4.0	7.7
Mozambique	...	...	...	20	16	16	16	16	16	17	17	17	17	...
	...	...	...	1.0	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	...
Nigeria	...	...	...	40	159	160	160	254	260	247	250	250	250	270
	...	...	...	2.0	7.9	8.0	8.0	12.6	12.9	12.3	12.5	12.5	12.5	13.4
Senegal	...	...	...	13	20	20	20	18	18	18	30	30	30	30
	...	...	...	0.6	1.0	1.0	1.0	0.9	0.9	0.9	1.5	1.5	1.5	1.5
Sierra Leone*	...	...	...	...	10	10	10	10	10	10	10	10	10	10
	...	...	...	...	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
South Africa	1	...	25	178	478	478	469	424	424	389	389	389	389	434
	...	...	1.2	8.9	23.8	23.8	23.4	21.1	21.1	19.4	19.4	19.4	19.4	21.6
Sudan	...	...	...	20	26	26	24	24	24	24	24	24	24	21
	...	...	...	1.0	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.0
Tanzania	...	...	...	14	17	17	12	14	17	17	14	14	14	14
	...	...	...	0.7	0.8	0.8	0.6	0.7	0.8	0.8	0.7	0.7	0.7	0.7
Togo*	...	...	...	...	20	20	20	20	20	20	20	20	20	20
	...	...	...	...	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Tunisia	...	...	...	23	34	34	34	34	34	34	34	34	34	34
	...	...	...	1.1	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Zaire*	...	...	...	...	17	16	17	17	17	17	17	17	17	17
	...	...	...	...	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Others	...	...	...	87	35	35	35	35	35	35	35	35	35	34
	...	...	...	4.3	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
Total	19	39	118	722	1,669	1,665	1,707	1,773	1,880	1,880	2,407	2,531	2,534	2,631
	0.8	1.9	5.7	36.2	82.7	82.5	84.9	85.0	94.8	93.8	122.2	125.8	125.5	130.5

*Prior to 1970, included in others

MIDDLE EAST

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Abu Dhabi*	...	...	...	...	15	14	14	128	135	185	185	185	185	180
	...	...	...	...	0.7	0.7	0.7	6.4	6.7	9.2	9.2	9.2	9.2	9.0
Bahrain	33	150	187	265	250	250	250	250	250	250	250	250	250	250
	1.6	7.5	9.3	13.2	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Iran	333	502	495	702	921	921	1,121	530	530	530	530	530	530	530
	16.6	25.0	24.7	35.0	45.9	45.9	55.8	26.4	26.4	26.4	26.4	26.4	26.4	26.4
Iraq	4	9	56	83	168	168	169	169	169	319	319	319	319	319
	0.2	0.4	2.8	4.1	8.4	8.4	8.4	8.4	8.4	8.4	15.9	15.9	15.9	15.9
Israel	...	83	87	115	195	195	190	190	190	190	170	170	180	180
	...	4.1	4.3	5.7	9.7	9.7	9.5	9.5	9.5	9.5	8.5	8.5	9.0	9.0
Jordan*	...	...	...	...	30	21	36	91	100	100	100	100	100	100
	...	...	...	...	1.5	1.0	1.8	4.5	5.0	5.0	5.0	5.0	5.0	5.0
Kuwait†	...	25	270	569	712	645	645	623	623	623	669	634	618	628
	...	1.2	13.4	28.3	35.5	32.1	32.1	31.0	31.0	31.0	33.3	31.6	30.8	31.3
Lebanon	...	6	24	37	53	53	52	52	52	52	17	17	37	37
	...	0.3	1.2	1.8	2.6	2.6	2.6	2.6	2.6	2.6	0.8	0.8	1.8	1.8
Qatar*	...	...	...	...	11	11	13	13	12	63	56	56	62	62
	...	...	...	...	0.5	0.5	0.6	0.6	0.6	3.1	2.8	2.8	3.1	3.1
Saudi Arabia†	...	140	189	465	487	487	487	487	705	860	840	1,115	1,125	1,375
	...	7.0	9.4	23.2	24.3	24.3	24.3	24.3	35.1	42.8	41.8	55.5	56.0	68.5
Syria	...	...	...	54	223	223	223	223	229	229	228	229	229	229
	...	...	...	2.7	11.1	11.1	11.1	11.1	11.4	11.4	11.4	11.4	11.4	11.4
Turkey	...	1	7	209	338	356	356	367	467	472	460	460	460	676
	...	...	0.3	10.4	16.8	17.7	17.7	18.3	23.3	23.5	22.9	22.9	22.9	33.7
Yemen, South	...	...	120	178	143	175	175	178	178	130	178	162	170	170
	...	...	6.0	8.9	7.1	8.7	8.7	8.9	8.9	6.5	8.9	8.1	8.5	8.5
Others	...	...	1	9	...	...	...	...	46	48	50	48	58	87
	...	...	...	0.4	...	...	...	...	2.3	2.4	2.5	2.4	2.9	4.3
Total	370	916	1,436	2,686	3,547	3,519	3,730	3,301	3,686	3,901	4,052	4,275	4,323	4,823
	18.4	45.5	71.4	133.7	176.6	175.2	185.8	164.5	183.7	194.3	201.9	213.0	215.4	240.4
Total, excl. U.S.S.R., China, E. Europe	6,617	10,524	21,148	42,084	63,704	64,374	65,547	65,348	60,741	58,472	57,820	55,250	55,299	58,096
	328.8	523.5	1,052.7	2,093.1	3,172.1	3,205.6	3,264.1	3,254.1	3,024.7	2,911.7	2,878.1	2,751.2	2,753.8	2,783.5

*Prior to 1979, included in others. †Includes Neutral Zone.

U.S.S.R.-EASTERN EUROPE-CHINA

Upper figures = 1,000 b/d
Lower figures = million t/y

	1940	1950	1960	1970	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
China	...	8	98	300	1,578	1,600	1,810	1,810	2,000	2,050	2,150	2,150	2,200	2,200
	...	0.4	4.9	14.9	78.6	79.7	90.1	90.1	99.6	102.1	107.1	107.1	109.6	109.6
Czechoslovakia	...	16	46	220	445	455	455	455	455	455	455	455	455	455
	...	0.8	2.3	11.9	22.2	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7	22.7
Hungary	...	20	58	130	230	290	312	312	311	312	242	242	242	220
	...	1.0	2.9	6.5	11.5	14.4	15.5	15.5	15.5	15.5	12.1	12.1	12.1	11.0
Poland	...	4	20	156	380	385	385	385	385	385	385	385	385	385
	...	0.2	1.0	7.8	18.9	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
Romania	...	182	260	356	533	608	617	617	617	617	617	617	617	617
	...	9.1	12.9	17.7	26.5	30.3	30.7	30.7	30.7	30.7	30.7	30.7	30.7	30.7
U.S.S.R.	...	900	2,800	5,640	10,478	10,950	11,400	11,600	11,750	12,000	12,200	12,260	12,260	12,260
	...	44.8	139.4	280.9	521.8	545.3	567.7	577.7	585.2	597.6	607.6	610.5	610.5	610.5
Others	...	4	40	332	823	852	852	852	898	894	894	894	894	852
	...	0.2	2.0	16.5	41.0	42.4	42.4	42.4	44.7	44.5	44.5	44.5	44.5	42.4
Total	...	1,134	3,322	7,134	14,467	15,140	15,831	16,031	16,416	16,713	16,943	17,003	17,053	16,989
	...	56.5	165.4	355.3	720.8	754.0	788.3	798.3	817.6	832.3	843.9	846.8	848.3	846.1
World Total	6,617	11,658	24,468	49,218	78,171	79,514	81,378	81,379	77,157	75,185	74,763	72,253	72,352	73,085
	328.8	580.0	1,218.1	2,450.4	3,892.6	3,959.6	4,052.4	4,052.4	3,842.3	3,744.0	3,723.0	3,598.1	3,603.1	3,639.6

Historical reserve data (billion bbl oil)

	1960	1965	1970	1975	1980	1985	1986	1988
Asia-Pacific								
Australia	—	—	2.0	1.7	2.4	1.4	1.4	1.7
Brunei	—	—	1.0	2.0	1.7	1.4	1.5	1.4
India	—	—	—	—	2.5	3.5	3.7	4.3
Indonesia	9.5	9.5	10.0	14.0	9.5	8.6	8.5	8.4
Malaysia	—	—	—	2.5	3.0	3.0	3.1	2.9
Europe								
Norway	—	—	1.0	7.0	5.5	8.3	10.9	14.8
United Kingdom	—	—	1.0	16.0	14.8	13.6	13.0	5.2
Middle East								
Abu Dhabi	—	10.0	11.8	29.5	29.0	30.5	31.0	92.2
Divided Zone	6.0	12.4	25.7	6.4	6.0	5.4	5.4	5.2
Dubai	—	—	—	1.0	1.4	1.4	1.4	4.0
Iran	35.0	40.0	70.0	64.5	57.5	48.5	47.9	92.8
Iraq	27.0	25.0	32.0	34.3	30.0	44.5	44.1	100.0
Kuwait	62.0	62.0	67.1	68.0	64.9	90.0	90.0	91.9
Oman	—	—	—	5.0	2.3	3.5	4.0	4.0
Qatar	2.5	3.0	3.5	5.8	3.6	3.4	3.3	3.2
Saudi Arabia	50.0	60.0	128.5	148.6	165.0	169.0	168.8	166.9
Syria	1.0	1.0	1.0	1.0	1.3	1.4	1.4	1.7
Africa								
Algeria	5.2	7.4	7.0	7.4	8.2	9.0	8.8	8.5
Angola-Cabinda	—	—	—	1.3	1.2	1.8	2.0	1.1
Egypt	—	2.0	4.5	3.9	2.9	3.2	3.8	4.3
Gabon	—	—	—	—	—	—	—	0.6
Libya	2.0	10.0	29.2	26.0	23.0	21.1	21.3	21.0
Nigeria	—	3.0	9.3	20.2	16.7	16.7	16.6	16.0
Tunisia	—	—	—	1.0	1.7	1.5	1.8	1.8
Western Hemisphere								
Argentina	2.2	1.9	4.5	2.5	2.5	2.3	2.3	2.3
Brazil	—	—	—	—	1.3	1.9	2.0	2.3
Canada	—	7.5	10.7	7.1	6.4	7.1	6.5	6.8
Colombia	—	1.5	1.7	1.7	1.0	0.624	1.2	1.6
Ecuador	—	—	—	2.5	1.1	1.4	1.6	1.6
Mexico	2.3	2.5	3.2	9.5	44.0	48.6	49.3	48.6
Venezuela	18.5	17.3	14.0	17.7	17.9	25.8	25.6	56.3
U.S.A.	33.5	35.4	37.0	33.0	26.4	27.3	28.0	25.3
Total Non-Communist	**268.5**	**319.6**	**511.4**	**555.7**	**562.2**	**614.6**	**618.8**	**808.1**
U.S.S.R.	33.5	33.5	77.0	80.4	63.0	63.0	61.0	59.0
China	—	—	—	—	—	19.1	18.4	18.4
Other	—	—	—	—	—	—	—	1.8
Total World	**302.0**	**353.1**	**611.4**	**658.7**	**648.5**	**698.7**	**700.1**	**887.3**

Refinery throughputs

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
	(Thousand barrels daily)										
U.S.	13,435	14,625	14,780	14,465	13,520	12,470	11,775	11,685	12,045	12,005	12,710
Canada	1,710	1,805	1,820	1,960	2,085	1,945	1,650	1,545	1,570	1,495	1,475
Latin America	5,670	5,715	5,975	6,220	6,460	6,575	6,080	5,825	5,715	5,285	5,265
Western Europe	13,180	12,775	12,855	13,665	12,330	10,970	10,075	9,710	9,790	9,490	10,095
Middle East	2,300	2,240	2,535	2,365	2,445	2,205	2,245	2,515	2,665	2,795	2,950
Africa	1,055	1,165	1,280	1,355	1,460	1,525	1,735	1,920	1,975	2,015	2,095
Japan	4,230	4,285	4,240	4,340	4,015	3,630	3,360	3,255	3,355	3,120	2,990
Southeast Asia	1,865	2,030	2,330	2,450	2,370	2,480	2,335	2,380	2,455	2,650	2,730
South Asia	550	605	645	675	705	795	840	880	885	1,020	1,110
Australasia	655	680	690	700	640	655	625	605	615	580	570
Total Non-Communist	**45,650**	**45,925**	**47,150**	**48,195**	**46,030**	**43,250**	**40,720**	**40,320**	**41,070**	**40,455**	**41,990**
Communist	11,575	11,930	12,875	13,230	13,320	13,420	13,575	13,675	13,885	14,165	14,280
Total World	**56,225**	**57,855**	**60,025**	**61,425**	**59,350**	**56,670**	**54,295**	**53,995**	**54,955**	**54,620**	**56,270**

Source: British Petroleum

occurring in Texas (27) and Louisiana (8).

The U.S. across-the-board drop derives in part from its reduced natural-gas production in the 1980s. Except for a slight increase in 1984, U.S. natural-gas production since 1980 has dropped by more than 3.6 bcf (−17.7%; Table 3).

U.S. adjustments

Plant-by-plant natural-gas throughput and NGL production figures must be qualified by the absence from these data of figures from Phillips Petroleum Co., Bartlesville, Okla. It does not break out gas throughput and NGL data but reports only totals.

Phillips does report gross data for natural-gas throughput and NGL production for each of the years of this decade.

For 1986, the following figures were available: Natural-gas throughput was 2 bcfd; total NGL production was 191,600 b/d (approximately 8 million gpd).

Phillips' 1986 NGL production, when added to the more specific OGJ figures, brings total 1986 U.S. NGL production to 63.7 million gpd (approximately 1.5 million b/d; Table 1).

The company's share of 1986 U.S. production, therefore, is 12.6%.

Its 1986 natural-gas throughput, again when added to OGJ figures, brings total 1986 U.S. throughput to 38.3 bcfd, Phillips' share being 5.2%.

These estimates show the company is by far the largest U.S. processor of natural gas and producer of NGL's.

States and new plants

Texas continues to lead all states with 357 gas plants, 11.6 bcfd of gas throughput, and 25.7 million gpd (approximately 610,942 b/d) in NGL production (exclusive of Phillips' Texas plant data). Texas' share of daily 1986 U.S. throughput was 31.8%; of NGL production, 46.1%.

Louisiana, with 86 gas plants, leads the states in gas capacity with 19.9 bcfd (Texas has 19 bcfd) and ranks second in throughput (11.6 bcfd) and NGL production (10.1 million gpd). The state's share of throughput is 28%; capacity, 30.4% and production, 18.2%.

Combined capacities for Louisiana and Texas represent more than 59% of total U.S. 1986 daily capacity; slightly less than 60% of throughput; and more than 64% NGL production.

New Mexico saw the largest increase in capacity of 293.8 MMcfd (9.4%) over Jan. 1, 1986, and the largest increase in NGL production, 1.1 million gpd (26,190 b/d, 31.9%).

New Mexico's spurt is due to the start up in November 1986 of Conoco Inc.'s San Juan gas plant near Bloomfield, N.M.

The facility has a throughput capacity of 500 MMcfd and a production rate of 42,000 b/d. It is operated by Conoco, a subsidiary of Du Pont Co., under a joint venture with Tenneco Oil, a unit of Tenneco Inc.

Also, late in 1986, ARCO Alaska Inc. and its partners started up the previously mentioned $450-million Prudhoe Bay gas-processing plant.

The plant has production capacity of 50,000 b/d of NGL for mixing with Prudhoe crude oil and as much as 335 MMcfd of miscible injectant for Prudhoe's tertiary enhanced oil-recovery project.

NGL production in non-Communist

Table 1

Worldwide gas processing roundup

Region	*1985	1986	Change	Change, %
U.S.				
Gas capacity, MMcfd	67,729.1	**68,811.1**	+1,082.0	+1.6
Gas throughput, MMcfd	†40,953.8	**†38,314.3**	−2,639.5	−6.4
Gas liquids production, 1,000 gpd	†64,446.3	**†63,685.0**	−761.3	−1.2
Proved gas reserves, bcf	§197,000.0	¶185,400.0	−11,600.0	−5.9
Canada				
Gas capacity, MMcfd	22,807.9	**23,460.2**	+652.3	+2.9
Gas throughput, MMcfd	12,447.8	**12,393.0**	−54.8	−0.4
Gas liquids production, 1,000 gpd	16,111.7	**15,835.3**	−276.4	−1.7
Proved gas reserves, bcf	§99,700.0	¶99,600.0	−100.0	−0.1
Western Europe				
Gas capacity, MMcfd	13,781.2	**13,813.4**	+32.2	+0.2
Gas throughput, MMcfd	8,509.2	**5,220.1**	−3,289.1	−38.7
Gas liquids production, 1,000 gpd	5,040.4	**5,907.9**	+867.5	+17.2
Proved gas reserves, bcf	§226,407.0	¶229,730.0	+3,323.0	+1.5
Latin America				
Gas capacity, MMcfd	11,809.3	**11,921.4**	+112.1	+0.9
Gas throughput, MMcfd	9,303.5	**9,149.5**	−154.0	−1.7
Gas liquids production, 1,000 gpd	15,967.4	**16,374.2**	+406.8	+2.5
Proved gas reserves, bcf	§189,271.0	¶190,070.0	+799.0	+0.4
Middle East				
Gas capacity, MMcfd	10,111.0	**10,556.0**	+445.0	+4.4
Gas throughput, MMcfd	3,147.7	**3,608.8**	+461.1	+14.6
Gas liquids production, 1,000 gpd	9,095.1	**8,774.9**	−320.2	−3.5
Proved gas reserves, bcf	§855,863.0	¶925,300.0	+69,437.0	+8.1
Africa				
Gas capacity, MMcfd	8,155.2	**8,205.2**	+50.0	+0.6
Gas throughput, MMcfd	6,367.2	**6,468.2**	+101.0	+1.6
Gas liquids production, 1,000 gpd	13,370.0	**13,574.4**	+204.4	+1.5
Proved gas reserves, bcf	§198,322.0	¶201,440.0	+3,118.0	+1.6
Asia-Pacific				
Gas capacity, MMcfd	6,011.3	**6,100.3**	+89.0	+1.5
Gas throughput, MMcfd	3,755.7	**3,855.0**	+99.3	+2.6
Gas liquids production, 1,000 gpd	8,679.7	**8,581.5**	−98.2	−1.1
Proved gas reserves, bcft	§171,497.0	¶198,640.0	+27,143.0	+15.8
TOTALS				
Gas capacity, MMcfd	140,405.0	**142,867.6**	+2,462.6	+1.8
Gas throughput, MMcfd	†84,484.9	**†79,008.9**	−5,476.0	−6.5
Gas liquids production, 1,000 gpd	†133,980.6	**†132,733.2**	−1,247.4	−0.9
Proved gas reserves, bcf	§1,938,060.0	¶2,030,180.0	+92,120.0	+4.7

* OGJ, July 14, 1986, p. 60. † Figures include data from annual reports of Phillips Petroleum Co., Bartlesville, Okla. § As of Jan. 1, 1986 (OGJ, Dec. 30, 1985, pp. 66-67). ¶ As of Jan. 1, 1987 (OGJ, Dec. 22/29, 1986, pp. 36-37).

Table 2

Worldwide gas processing-plant construction*

Area	1986	1987
United States	28	17
Canada	6	6
Latin America	5	2
Europe	8	6
Middle East/Africa	5	8
Asia-Pacific	8	9
Total	**60**	**48**

* Non-Communist; planned, expanding, or under construction.

Source: OGJ, Apr. 28, 1986, pp. 86-87; Apr. 13, 1987, pp. 59-60.

U.S., Canadian gas-processing activity

1

Fig. 1a

U.S. decline continues...

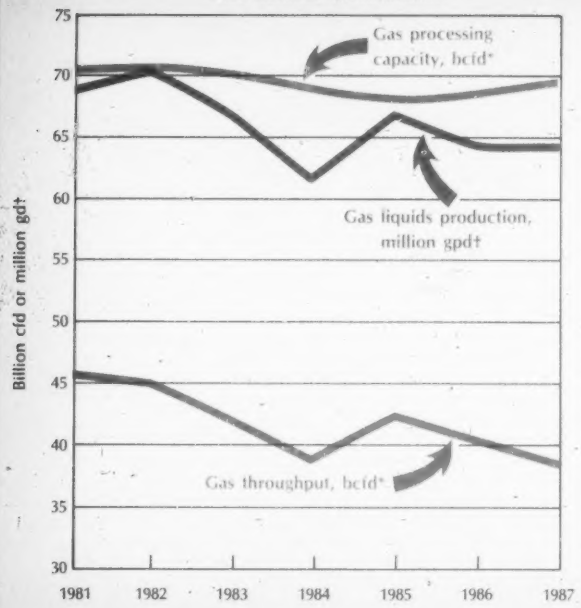
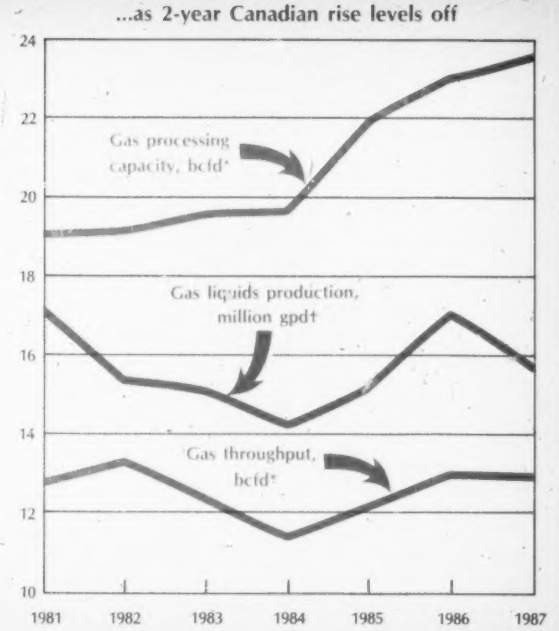


Fig. 1b

...as 2-year Canadian rise levels off



*As of Jan. 1 of each year; U.S. throughput figures include data from Phillips Petroleum Co. †Based on 12-month average for previous year; U.S. figures include data from Phillips Petroleum Co.

regions outside the U.S. was flat for 1986, down 486,100 gpd (−0.7%) to 69.05 million gpd.

By region for the 1985-1986 period (Fig. 3), here are the NGL production trends evident:

- Canada dropped almost 0.3 million gpd (−1.7%) to 15.8 million gpd.
- Latin America production was up 406,800 gpd (2.5%) to 16.4 million gpd.
- Western Europe increased its production by 867,500 gpd (17.2%) to 5.9 million gpd over 1985. After being up 501,800 gpd (11.1%) in 1985 compared to 1984, the area's production is up 2 years' running by 1.4 million gpd (30.2%).
- The Middle East dropped 320,200 gpd (−3.5%) to 8.8 million gpd in the second consecutive yearly loss.
- African production was up in 1986 by 204,400 gpd (1.5%) to 13.6 million gpd.
- The nations of the Asia-Pacific region reduced production by 98,000 gpd (−1.1%) to 8.6 million gpd.

But the area remains up 5.2 million gpd (64.1%) over 1984: 1985 had been up 3.4 million gpd (65.9%) over 1984.

1980s world expansion

NGL production for these regions outside the U.S. has been on a steady increase for the 1980s.

For the decade, production is up 13.9 million gpd (330,000 b/d, or 25.1%), over 55.2 million gpd for 1980, despite a 3.4% drop for 1981.

In NGL production by region for the 1980s, Canada was overtaken in 1986 by Latin America. The two regions have been swapping the lead in production yearly since 1984.

In growth of production rate for the decade, however, the Asia-Pacific region has made the greatest strides, gaining 6.1 million gpd (244%), from 2.5 million gpd in 1980 to 8.6 million gpd in 1986. Latin America's NGL production has

Table 3

World's 20 top gas-producing countries in 1986

Country	Production, bcf	Share, %
U.S.S.R.	24,215.8	38.0
United States	16,688.0	26.2
Canada	3,168.3	5.0
The Netherlands	2,623.3	4.1
United Kingdom	1,634.0	2.6
Mexico	1,252.3	2.0
Algeria	1,238.3	1.9
Romania	1,210.2	1.9
Indonesia	1,155.9	1.8
Norway	906.2	1.4
Argentina	661.8	
China	646.0	
Venezuela	615.1	
West Germany	545.4	
Italy	527.3	8.0
Australia	524.1	
Iran	489.3	
Pakistan	390.3	
United Arab Emirates	362.1	
Saudi Arabia	328.7	
Top 20	59,182.4	92.9
Others	4,500.8	7.1
Total	**63,683.2**	**100.0**

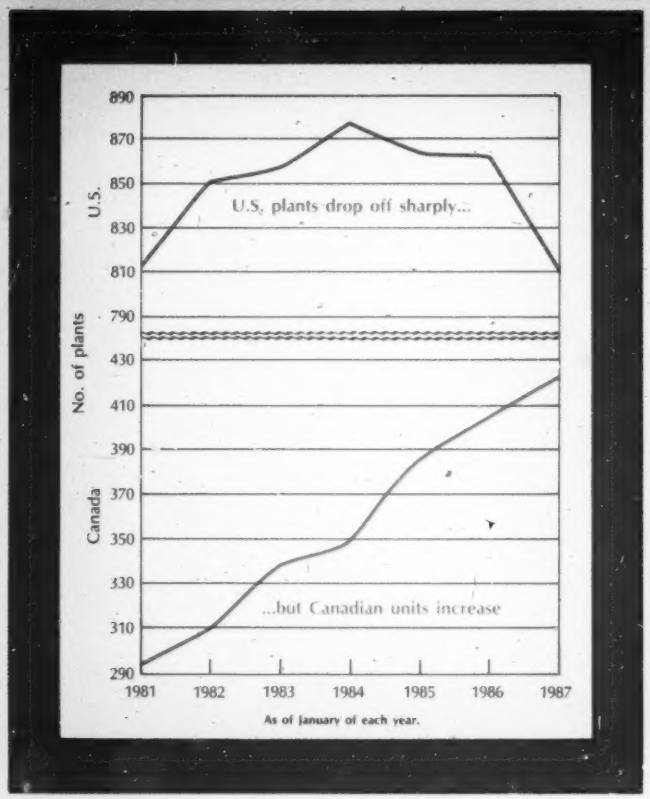
Source: Oil & Gas Journal, Mar. 9, 1987, p. 16.

WORLDWIDE GAS PROCESSING

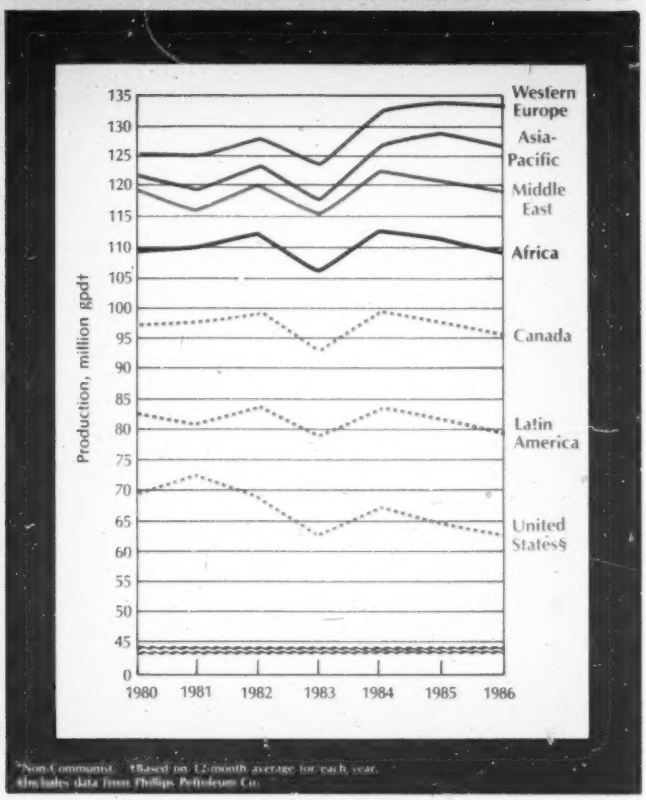
Capacities as of January 1, 1987, and average production

Country	No. plants	MMcfd: Gas capacity	MMcfd: Gas throughput	Production—1,000 gal/day (Average based on the past 12 months): Ethane	Prop.	Isobut.	Process or unsplit butane	LP-gas mix	Raw NGL mix	Debut. nat. gaso.	Other	Total products
United States												
Alabama	5	173.0	136.3	16.0	153.8	18.3	114.3	....	1.2	75.7	....	379.3
Alaska	3	3,382.0	44.4	....	2.9	....	....	....	38.4	....	....	41.3
Arkansas	5	953.0	486.8	....	15.7	3.4	10.7	....	44.0	14.4	5.9	94.1
California	36	1,015.2	682.8	16.8	462.8	16.4	241.1	76.8	370.0	92.8	0.3	1,277.0
Colorado	43	1,016.2	467.7	....	205.6	0.2	43.5	27.5	564.5	35.2	10.6	887.1
Florida	2	790.0	688.7	105.4	151.0	16.4	78.1	....	....	77.7	....	428.6
Kansas	26	5,429.5	3,544.6	195.7	650.7	71.0	180.2	0.9	1,009.9	155.9	0.3	2,264.6
Kentucky	2	71.0	65.5	....	....	....	....	....	....	....	214.8	214.8
Louisiana	86	19,941.6	10,178.4	1,437.3	1,142.9	306.7	432.0	19.1	5,479.7	749.6	562.4	10,129.7
Michigan	27	4,744.6	1,600.7	....	90.5	....	101.9	....	778.0	20.8	29.9	1,021.1
Mississippi	5	899.0	355.3	....	9.6	....	8.9	....	16.2	11.2	....	45.9
Montana	7	52.0	28.9	....	27.7	3.9	7.8	15.1	21.5	9.6	0.9	86.5
Nebraska	2	3.5	2.0	....	....	....	....	....	6.5	....	....	6.5
New Mexico	30	3,435.4	1,878.8	297.0	196.0	16.6	67.0	....	3,892.5	80.2	17.1	4,566.4
North Dakota	11	346.7	250.2	....	192.2	....	94.9	....	161.8	96.0	13.6	558.5
Oklahoma	109	4,949.0	2,791.7	517.7	711.4	92.7	248.1	325.5	3,033.0	286.7	217.1	5,432.2
Texas	357	19,045.5	11,574.4	3,395.5	3,464.9	536.2	1,464.4	697.4	12,441.7	1,888.9	1,770.6	25,659.6
Utah	11	516.5	236.2	....	96.2	....	28.2	....	153.6	40.4	....	318.4
West Virginia	7	379.0	321.9	210.1	129.6	22.1	41.8	78.1	282.8	2.0	....	766.5
Wyoming	36	1,668.4	979.0	7.7	271.5	2.9	165.0	2.7	587.3	76.2	146.4	1,459.7
Total U.S.	**810**	**68,811.1**	**°38,314.3**	**6,199.2**	**7,975.0**	**1,106.8**	**3,327.9**	**1,243.1**	**28,882.6**	**3,913.3**	**2,989.9**	**63,685.0**
Abu Dhabi	5	2,498.0	1,551.8	....	357.2	288.8	20.2	....	....	203.9	309.2	1,179.3
Algeria	4	5,335.2	4,268.2	....	....	....	....	632.8	....	....	5,449.2	6,082.0
Argentina	11	1,715.0	1,428.4	545.0	500.5	....	348.4	....	....	304.0	....	1,697.9
Australia	5	2,007.0	1,180.0	279.0	923.0	....	469.0	....	941.0	2,782.0	611.0	6,005.0
Austria	2	5.7	1.6	....	....	....	....	....	....	....	....	....
Bahrain	1	168.0	155.0	....	117.6	....	100.8	....	....	144.9	....	363.3
Bangladesh	8	460.0	80.0	....	....	....	....	....	....	1.3	14.9	16.2
Bolivia	2	474.0	177.3	....	1.4	2.5	....	161.7	....	61.5	136.9	364.0
Brazil	6	369.4	309.2	....	....	....	....	399.7	222.4	89.6	....	711.7
Brunei	2	998.0	819.0	....	19.9	....	....	....	86.1	238.0	....	344.0
Canada												
Alberta	391	20,832.4	11,326.3	4,426.9	1,767.8	220.9	824.3	1,119.0	4,208.3	2,705.4	104.0	15,376.6
British Columbia	12	2,236.4	929.9	....	137.6	....	82.1	....	....	94.8	....	314.5
Northwest Territories	2	196.0	22.1	....	....	....	....	....	....	....	....	....
Saskatchewan	14	195.4	114.7	39.2	....	....	....	....	81.4	0.4	23.2	144.2
Chile	2	470.0	430.0	....	194.9	....	122.9	....	....	104.2	....	422.0
China, Taiwan	4	271.0	105.7	41.2	29.8	1.9	16.9	....	1.6	14.9	....	106.3
Colombia	4	238.0	170.6	90.3	58.0	....	58.0	4.3	....	56.5	....	267.1
Denmark	1	450.0	200.0	....	....	....	....	....	....	....	50.0	50.0
Dominican Republic	1	....	....	....	....	....	....	....	....	....	277.2	277.2
Dubai	1	330.0	312.0	....	....	....	....	....	....	....	820.0	820.0
Ecuador	2	....	....	....	....	....	....	2.4	9.1	....	....	11.5
Egypt	7	1,019.0	973.0	....	....	211.7	....	187.8	....	....	927.1	1,326.6
France	1	570.0	563.0	....	139.0	....	132.0	....	....	270.0	....	541.0
Germany	5	542.9	451.0	....	....	....	....	....	....	....	....	....
Greece	1	10.5	9.5	....	....	....	....	....	85.0	....	....	85.0
Hungary	12	947.1	567.5	....	49.3	9.6	50.0	111.6	302.1	155.0	387.7	1,065.3
Indonesia	10	884.3	612.4	....	498.2	....	....	51.6	445.2	219.7	327.9	1,542.6
Italy	17	7,249.0	1,462.0	....	....	....	....	24.1	159.1	10.9	....	194.1
Kuwait	1	1,680.0	360.0	....	834.0	....	548.0	....	....	305.0	85.0	1,772.0
Libya	7	1,851.0	1,227.0	....	....	....	....	37.8	5,577.0	....	551.0	6,165.8
Malaysia	2	282.0	120.0	....	140.0	120.0	....	55.0	....	150.0	....	465.0
Mexico	10	4,334.0	3,249.0	3,487.7	5,657.2	3.5	153.0	385.4	....	316.5	14.0	10,017.3
Netherlands	1	440.0	81.5	....	....	....	....	....	....	....	5.5	5.5
New Zealand	2	248.0	127.0	....	30.0	....	....	....	....	10.0	....	40.0
Norway	2	950.0	401.0	....	693.3	91.2	234.3	....	201.6	178.7	....	1,399.1
Pakistan	5	950.0	810.9	....	....	....	....	47.0	....	7.6	7.8	62.4
Peru	2	70.0	37.0	....	2.1	....	0.8	7.2	25.4	....	3.2	38.7
Qatar	2	560.0	260.0	....	496.7	....	313.8	....	....	217.6	....	1,028.1
Saudi Arabia	5	4,300.0	....	....	....	....	....	....	1,176.0	....	....	1,176.0
Sharjah	2	1,020.0	970.0	....	88.1	....	96.8	....	....	....	2,251.3	2,436.2
United Kingdom	7	2,648.2	1,483.0	....	332.0	....	291.0	....	116.8	1,748.5	79.6	2,567.9
Venezuela	17	4,251.0	3,348.0	....	394.5	137.2	132.7	440.8	1,222.4	239.2	....	2,566.8
Total, outside U.S.	**598**	**74,056.5**	**40,694.6**	**8,909.3**	**13,462.1**	**1,087.3**	**3,995.0**	**3,868.2**	**14,860.5**	**10,630.1**	**12,435.7**	**69,048.2**

U.S., Canada gas-processing facilities 2



U.S., world* NGL output slides 3



*Non-Communist. †Based on 12-month average for each year. §Includes data from Phillips Petroleum Co.

Table 4

World's major gas reserves*

Country	Est. proved reserves, tcf	Share, %
U.S.S.R.	1,550.0	42.7
Iran	450.0	12.4
United States	185.4	5.1
Qatar	152.0	4.2
Saudi Arabia	124.0	3.4
Algeria	106.0	2.9
Norway	103.2	2.8
Canada	99.6	2.7
Abu Dhabi	90.0	2.5
Mexico	76.5	2.1
The Netherlands	70.4	1.9
Venezuela	59.0	1.6
Indonesia	49.4	1.4
Malaysia	49.4	1.4
Nigeria	47.0	1.3
United Kingdom	33.4	
China	30.0	
Iraq	28.0	
Argentina	23.0	
Libya	21.2	5.2
Australia	18.7	
Pakistan	18.7	
India	17.6	
Subtotal	**3,402.5**	**†93.8**
Others	**223.5**	**6.2**
Total	**3,626.0**	**†100.0**

* As of Jan. 1, 1987. † Entries may not add precisely due to rounding.

Source: OGJ, Dec. 22/29, 1986, pp. 36-37.

grown by 6 million gpd (142,857 b/d, 57.7%), from 10.4 million gpd in 1980 to 16.4 million gpd in 1986.

Western Europe's production has also seen significant increases this decade.

Although flat for the 2-year period 1982-1984, the region's production overall since 1980 has grown by 2.5 million gpd (74.4%) to 5.9 million gpd.

Africa's production is up 961,100 gpd (7.6%), while Canada and the Middle East are down, 966,900 (−5.8%) and 272,400 gpd (−3.3%), respectively.

As with U.S. figures, some explanation for this trend may be found in the regions' natural-gas liftings data (Table 3) since 1980: Non-Communist gas liftings outside the U.S. have shot up by 4.4 bcf to 19.9 tcf, an increase of 28.6%.

For the 1980s, capacity for these regions has sprinted ahead by 23.2 bcfd (45.7%) since 1980 to 74.1 bcfd. Throughput, despite its decline last year and in 1981, is also up for the decade by 5.9 bcfd (17%) to 40.7 bcfd.

Western Europe's 5.7-bcfd increase (69.9% over its 1980 capacity) is the largest by volume, representing a regional share at 24.4% of the total increase.

The Middle East's 4.9-bcfd (87.8%) increase represents a 21.2% portion.

And Canada's 4.8 bcfd (25.4%) is a 20.5% share, although by country and by region it continues to lead the non-Communist world outside the U.S. in capacity (23.5 bcfd) and throughput (12.4 bcfd; Table 1).

Sulfur-recovery progress

Canada and the U.S. accounted for 54,999.6 metric ton/day of sulfur-recovery capacity in 1986, representing 59.8% of the world's capacity of 91,993.9 metric ton/day.

The remaining regions of the non-Communist world had a daily capacity of 36,994.3 metric tons (40.2%). •

Gas production (billions cu ft)

	1987
WESTERN HEMISPHERE	
Argentina	659.6
Bolivia	98.2
Brazil	203.4
Canada	3,472.7
Chile	70.8
Colombia	180.4
Ecuador	2.3
Guatemala	0.6
Mexico	1,277.4
Peru	46.0
Trinidad	135.5
United States	17,107.0
Venezuela	680.3
Total	**23,934.2**
EUROPE	
Austria	41.1
Denmark	85.7
France	136.8
Germany, Fed. Rep.	658.9
Greece	3.6
Italy	697.2
Netherlands	2,731.2
Norway	994.1
Spain	26.0
Turkey	14.0
United Kingdom	1,655.3
Total	**7,043.9**
MIDDLE EAST	
Bahrain	175.8
Iran	670.7
Iraq	59.9
Israel	2.1
Kuwait	156.1
Oman	62.4
Qatar	164.4
Saudi Arabia	740.9
Syria	16.8
United Arab Emirates	575.0
Total	**2,624.1**
ASIA-PACIFIC	
Afghanistan	100.1
Australia	532.8
Brunei	283.6
Burma	31.7
India	269.1
Indonesia	1,234.8
Japan	77.1
Malaysia	460.9
New Zealand	189.7
Pakistan	419.8
Taiwan, China	35.7
Thailand	162.3
Total	**3,797.6**
AFRICA	
Algeria	1,471.6
Angola	6.6
Congo	—
Egypt	195.2
Gabon	2.4
Ivory Coast	—
Libya	235.2
Morocco	2.1
Nigeria	98.8
Tunisia	13.8
Total	**2,025.7**
COMMUNIST	
China	723.9
Romania	1,267.8
USSR	25,673.8
Other	1,077.0
Total	**26,742.5**
WORLD TOTAL	**68,168.0**

completions—1986*

	Total wells	Total producers	Total wildcats	Total successes
NORTH AMERICA				
U.S.A.	51,045	34,064	9,006	2,222
Canada	5,991	4,284	2,034	1,124
OCEANIA				
Australia	169	—	139	12
New Zealand	24	4	24	4
AFRICA-CENTRAL, SOUTH				
Angola	48	—	17	5
Cameroon	5	—	5	1
Central African Rep.	1	—	1	0
Chad	4	—	4	1
Congo	32	—	5	2
Equatorial Guinea	1	—	1	0
Gabon	21	—	12	7
Ghana	2	—	2	0
Kenya	1	—	1	0
Malagasy Rep.	3	—	3	0
Mozambique	1	—	1	0
Nigeria	56	—	29	18
Somali Rep.	1	—	1	0
South Africa	32	—	32	5
Togo	1	—	1	0
Zaire	8	—	2	1
EUROPE				
Austria	38	29	13	4
Fed. Rep. Germany	56	38	34	14
France	128	52	78	9
Greece	2	0	2	0
Ireland	7	1	7	1
Italy	200	124	117	48
Netherlands	23	14	12	3
North Sea				
Danish	22	15	8	2
Dutch	66	40	29	12
Norwegian	98	67	41	25
British	249	129	146	48
Spain	21	7	18	4
Sweden	5	4	0	0
U.K.	68	22	64	18
Yugoslavia	196	137	61	26
FAR EAST				
Brunei	27	—	13	—
Burma	93	—	3	—
India	164	—	49	—
Indonesia	647	—	122	—
Japan	24	—	17	—
Korea	1	—	1	—
Malaysia	82	—	14	—
Pakistan	70	—	15	—
China	5,525	—	25	—
Philippines	0	—	0	—
Taiwan	19	—	13	—
Thailand	20	—	7	—
Israel	7	0	3	0
MIDDLE EAST				
Bahrain	22	20	2	0
Iraq	40	—	2	2
Oman	210	178	32	14
Yemen-PDR (South)	—	—	3	—
Syria	35	—	24	5
Turkey	84	66	25	7
Abu Dhabi	85	58	9	5
Dubai	24	22	2	0
Ras al Khaimah	2	1	1	0
Umm al Qaiwain			1	0
Yemen Arab Rep. (N)			10	1
Iran	58	49	7	—
Kuwait	59	59	0	0
Saudi Arabia	33	27	6	—
NORTH AFRICA				
Algeria	—	—	30	—
Egypt	172	76	54	18
Libya	41	—	27	—
Morocco	5	1	5	1
Sudan	2	—	2	—
Tunisia	19	13	6	1
LATIN AMERICA				
Argentina	820	629	92	27
Bahamas	1	0	1	0
Barbados	11	11	2	2
Bolivia	18	13	4	1
Brazil	1,086	863	163	59
Chile	92	56	18	9
Colombia	218	179	44	19
Ecuador	33	22	4	2
Guatemala	4	2	2	1
Mexico	247	158	68	22
Paraguay	1	0	1	0
Peru	148	117	11	7
Suriname	46	30	9	0
Trinidad-Tobago	162	128	8	3
Uruguay	3	0	3	0
Venezuela	254	239	25	21

* AAPG data.